HIT 160 010 005 4E

Chevron

April 8, 1997

Chevron Products Company
91-480 Malakole Street
Kapolei, HI 96707

Rick L. Roberts
Manager, Hawaii Refinery
(808) 682-5711

Mr. Carl Warren
RCRA Permits Section
U.S. Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco, CA 94105

CERTIFIED LETTER No. Z 108 621 072
RETURN RECEIPT REQUESTED

GROUNDWATER SAMPLING RESULTS
CHEVRON HAWAII REFINERY LAND TREATMENT FACILITY (HIT 160 010 005)

Dear Mr. Warren:

Enclosed you find the first quarter 1997, land treatment facility (LTF) groundwater monitoring results for the Chevron Hawaii Refinery.

As has previously been observed, an exceedance of the regulatory threshold value of 10 micrograms per liter (µg/L) for 1-methylnaphthalene was detected during the quarterly groundwater sampling event in background well MW-12 at a concentration of 53 µg/L (45 µg/L in the duplicate sample). No other permit exceedances were observed.

As per Chevron's agreement with EPA from our July 22, 1996, meeting, effective June 1, Appendix IX sampling will no longer be performed when permit exceedances occur in the quarterly groundwater monitoring program. As agreed with EPA, Chevron will continue to implement the quarterly monitoring program until a closure plan for the LTF is accepted by the EPA.

Also enclosed are the groundwater sampling log sheets indicating pH results from respective monitoring wells.

Should you have any questions or require additional information, please contact Susan Colborn of our Environmental Staff at (808) 682-2205.

Sincerely,

Rick L Robert

Rick L. Roberts

cc: Mr. Steven Y.K. Chang, HDOH
Attachment

RECORDS SEPARATOR PAGE

DAMES & MOORE
A DAMES & MOORE GROUP COMPANY

1050 Queen Street, Suite 204
Honolulu, Hawaii 96814
808 593 1116 Tel
808 593 1198 Fax

March 31, 1997

Chevron Products Company
Hawaii Refinery
91-480 Malakole Street
Kapolei, HI 96707

Attention: Ms. Susan Colborn
Environmental Specialist

Re: First Quarter 1997
Groundwater Sampling Results
Land Treatment Facility
Chevron Hawaii Refinery
Kapolei, Oahu, Hawaii
For Chevron Products Company

Dear Ms. Colborn:

Dames & Moore is pleased to submit to the Chevron Products Company (Chevron) the first quarter 1997 groundwater monitoring data and data validation results for the land treatment facility (LTF) at the Chevron Hawaii Refinery (Refinery) located in Kapolei, Hawaii. We are submitting this information as part of the quarterly groundwater sampling and data validation performed by Chevron on the LTF groundwater monitoring program at the Refinery.

LTF groundwater monitoring wells MW-11 (B series sample numbers), MW-12 (A and E series sample numbers), MW23A (C series sample numbers), and MW26A (D series sample numbers) were sampled on February 18 and 19, 1997 for the quarterly monitoring analytes specified in the LTF permit. The First Quarter 1997 groundwater samples were delivered to Pace Analytical Laboratory located in Petaluma, California for analysis under standard turnaround times. A complete copy of the laboratory report that presents the analytical results for the First Quarter 1997 LTF groundwater monitoring program is attached.

Level III data validation was completed on all First Quarter 1997 LTF groundwater data by a Dames & Moore chemist. The results of the data validation indicate that all data are usable, without qualifications, except for the non-detects of mercury in all field and quality control samples. As a result of low matrix spike recoveries, the detection limits associated with all non-detects of mercury were qualified as estimated. Estimated results are usable with qualification. None of the data were rejected as not usable.

Permit limit exceedances above the threshold value of 10 micrograms per liter (μg/L) were reported for 1-methyl-naphthalene in both the primary and duplicate samples from the upgradient well MW-12 (53 μg/L and 45 μg/L, respectively). No other permit exceedances were observed.

Per our discussion with EPA at a meeting on July 22, 1996, effective June 1, sampling each of the LTF wells and analysis for Appendix IX analytes will no longer be performed when permit exceedances occur in the quarterly groundwater monitoring program. As agreed with EPA, Chevron will continue to perform the quarterly monitoring program with this modification until a closure plan for the LTF is accepted by EPA.

Please call if you have any questions or comments regarding these results.

Very truly yours,

DAMES & MOORE

Daniel I. Hakim
Project Chemist

Edward Tschupp/for
Mary J. Esper
Project Manager

cc: Ed Tschupp, Dames & Moore

Attachments: Table 1
Validation Reports (Table 2)
Laboratory Data

TABLE 1
CHEMICAL DATA SUMMARY
FIRST QUARTER 1997
LTF GROUNDWATER MONITORING PROGRAM
CHEVRON HAWAII REFINERY

	Detection Limit	Permit Limits	MW-12	MW-12 Duplicate	MW-11	MW-23A	MW-26A
Volatile Organic Compounds							
Benzene	2	5	ND	ND	ND	ND	ND
Toluene	2	1000	ND	ND	ND	ND	ND
Xylenes	5	10000	ND	ND	ND	ND	ND
Semivolatile Organic Compounds							
Naphthalene	10	10	ND	ND	ND	ND	ND
Chrysene	10	10	ND	ND	ND	ND	ND
1-Methylnaphthalene	10	10	53	45	ND	ND	ND
Metals							
Arsenic	5	50	ND	ND	5.7	5.9	ND
Chromium	7	100	ND	ND	ND	ND	ND
Lead	5	15	ND	ND	ND	ND	ND
Mercury	0.2 UJ	2	ND	ND	ND	ND	ND
Nickel	30	100	ND	ND	ND	ND	ND
Vanadium	12	80	ND	ND	ND	ND	ND

Explanations

All concentrations in micrograms per liter (µg/L)
ND: Not detected at or above laboratory detection limits
Shading: Concentrations exceeding permit limits
UJ: Detection limit for mercury is estimated.

TABLE 2
LEVEL III DATA VALIDATION REPORT
FIRST QUARTER 1997
LTF GROUNDWATER MONITORING PROGRAM
CHEVRON HAWAII REFINERY

Chevron Products Company (Q1-97 LTF GW Sampling)
PACE Analytical, No. 707759, Water

Analysis	Volatiles (BTX) 8020	Semivolatiles *8270	Metals 6010/7000
Samples	E, EB, FB, A, B, TRB1, C, D, TRB2	A, E, EB, FB, B, D, C	A, E, EB, FB, B, D, C
Holding Time	✓	✓	✓
Surrogate Recovery	✓	✓	NA
MS/MSD	Note 1	Note 2	Note 3
LCS (Blank Spike)	✓	✓	✓
Method Blanks	✓	✓	✓
Field Duplicates	✓	✓	✓
Trip, Equipment, Field Blanks	✓	✓	✓
Detection Limits	✓	✓	✓

BTX - benzene, toluene, total xylenes.
* - naphthalene, chrysene, 1-methylnaphthalene
EB - Equipment Blank
FB - Field Blank
TB - Trip Blank

Notes:

1. The sample that the laboratory spiked for the MS/MSD is not from this project and does not reflect the matrix of these samples.

2. Due to the special semivolatile target compound list, the samples were not placed in a QC batch and no MS/MSD is associated with the samples.

3. The sample that the laboratory spiked for the MS/MSD for arsenic and lead is not from this project and does not reflect the matrix of these samples. All other MS/MSD results are from a project sample. The mean recovery for the MS/MSD of mercury for 42.8% is below the QC limit of 75% to 125%. Detection limits associated with the non-detects of mercury were flagged "UJ," estimated.

Summary

These data are usable, as qualified, for their intended purpose. None of the data were qualified or rejected.

Pace Analytical Services, Inc.
1455 McDowell Blvd. North, Suite D
Petaluma, CA 94954
Tel: 707-792-1865
Fax: 707-792-0342

Pace Analytical

February 28, 1997

Mr. Stan Sato
Chevron Products Co.
Hawaii Refinery
91-480 Malakole Street
Kapolei, HI 96707

RE: Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

Dear Mr. Sato:

Enclosed are the results of analyses for sample(s) received on February 20, 1997. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Ron Chew
Project Manager

CA ELAP Certificate Number 2059

Enclosures

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1455 McDowell Blvd. North, Suite D
Petaluma, CA 94954
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Fax: 707-792-0342

Pace Analytical

DATE: 02/28/97
PAGE: 1

Chevron Products Co.
Hawaii Refinery
91-480 Malakole Street
Kapolei, HI 96707

Attn: Mr. Stan Sato
Phone: 808 682-2205

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

Pace Sample No: 70890983
Client Sample ID: A

Date Collected: 02/18/97
Date Received: 02/20/97

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury in Water								
Mercury	ND UJ	ug/L	0.2 UJ	02/24/97	EPA 7470	SMS	7439-97-6	
Arsenic, AAS Furnace								
Arsenic	ND	ug/L	5	02/25/97	EPA 7060	BBF	7440-38-2	
Date Digested				02/21/97				
Metals, ICP								
Chromium	ND	ug/L	7	02/21/97	EPA 6010	SMS	7440-47-3	
Nickel	ND	ug/L	30	02/21/97	EPA 6010	SMS	7440-02-0	
Vanadium	ND	ug/L	12	02/21/97	EPA 6010	SMS	7440-62-2	
Date Digested				02/21/97				
Lead, AAS Furnace								
Lead	ND	ug/L	5	02/27/97	EPA 7421	BBF	7439-92-1	
Date Digested				02/21/97				
GC -- Volatiles								
Aromatic Volatile Organics								
Benzene	ND	ug/L	2	02/27/97	EPA 8020	ADS	71-43-2	
Toluene	ND	ug/L	2	02/27/97	EPA 8020	ADS	108-88-3	
Xylene (Total)	ND	ug/L	5	02/27/97	EPA 8020	ADS	1330-20-7	
a,a,a-Trifluorotoluene (S)	110	%		02/27/97	EPA 8020	ADS	2164-17-2	
GC/MS -- Semi-VOA								
Semivolatile Organics								
Naphthalene	ND	ug/L	10	02/24/97	EPA 8270	PAA	91-20-3	
Chrysene	ND	ug/L	10	02/24/97	EPA 8270	PAA	218-01-9	
1-Methylnaphthalene	53	ug/L	10	02/24/97	EPA 8270	PAA	90-12-0	
Nitrobenzene-d5 (S)	68	%		02/24/97	EPA 8270	PAA	4165-60-0	
2-Fluorobiphenyl (S)	66	%		02/24/97	EPA 8270	PAA	321-60-8	
Terphenyl-d14 (S)	83	%		02/24/97	EPA 8270	PAA	1718-51-0	
Phenol-d6 (S)	64	%		02/24/97	EPA 8270	PAA	13127-88-3	
2-Fluorophenol (S)	55	%		02/24/97	EPA 8270	PAA	367-12-4	
2,4,6-Tribromophenol (S)	78	%		02/24/97	EPA 8270	PAA	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Pace Analytical

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

Pace Sample No: 70890983 Date Collected: 02/18/97
Client Sample ID: A Date Received: 02/20/97

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Date Extracted				02/21/97				

COPY

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Tel: 707-792-1865
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Pace Analytical

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

Pace Sample No: 70891007 Date Collected: 02/18/97
Client Sample ID: E Date Received: 02/20/97

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury in Water								
Mercury	ND UJ	ug/L	0.2 UJ	02/24/97	EPA 7470	SMS	7439-97-6	
Arsenic, AAS Furnace								
Arsenic	ND	ug/L	5	02/25/97	EPA 7060	BBF	7440-38-2	
Date Digested				02/21/97				
Metals, ICP								
Chromium	ND	ug/L	7	02/21/97	EPA 6010	SMS	7440-47-3	
Nickel	ND	ug/L	30	02/21/97	EPA 6010	SMS	7440-02-0	
Vanadium	ND	ug/L	12	02/21/97	EPA 6010	SMS	7440-62-2	
Date Digested				02/21/97				
Lead, AAS Furnace								
Lead	ND	ug/L	5	02/27/97	EPA 7421	BBF	7439-92-1	
Date Digested				02/21/97				
GC -- Volatiles								
Aromatic Volatile Organics								
Benzene	ND	ug/L	2	02/27/97	EPA 8020	ADS	71-43-2	
Toluene	ND	ug/L	2	02/27/97	EPA 8020	ADS	108-88-3	
Xylene (Total)	ND	ug/L	5	02/27/97	EPA 8020	ADS	1330-20-7	
a,a,a-Trifluorotoluene (S)	109	%		02/27/97	EPA 8020	ADS	2164-17-2	
GC/MS -- Semi-VOA								
Semivolatile Organics								
Naphthalene	ND	ug/L	10	02/24/97	EPA 8270	PAA	91-20-3	
Chrysene	ND	ug/L	10	02/24/97	EPA 8270	PAA	218-01-9	
1-Methylnaphthalene	45	ug/L	10	02/24/97	EPA 8270	PAA	90-12-0	
Nitrobenzene-d5 (S)	58	%		02/24/97	EPA 8270	PAA	4165-60-0	
2-Fluorobiphenyl (S)	58	%		02/24/97	EPA 8270	PAA	321-60-8	
Terphenyl-d14 (S)	86	%		02/24/97	EPA 8270	PAA	1718-51-0	
Phenol-d6 (S)	53	%		02/24/97	EPA 8270	PAA	13127-88-3	
2-Fluorophenol (S)	44	%		02/24/97	EPA 8270	PAA	367-12-4	
2,4,6-Tribromophenol (S)	79	%		02/24/97	EPA 8270	PAA	118-79-6	
Date Extracted				02/21/97				

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Pace Analytical

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

Pace Sample No: 70891015 Date Collected: 02/18/97
Client Sample ID: EB Date Received: 02/20/97

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury in Water								
Mercury	ND UJ	ug/L	0.2 UJ	02/24/97	EPA 7470	SMS	7439-97-6	
Arsenic, AAS Furnace								
Arsenic	ND	ug/L	5	02/25/97	EPA 7060	BBF	7440-38-2	
Date Digested				02/21/97				
Metals, ICP								
Chromium	ND	ug/L	7	02/21/97	EPA 6010	SMS	7440-47-3	
Nickel	ND	ug/L	30	02/21/97	EPA 6010	SMS	7440-02-0	
Vanadium	ND	ug/L	12	02/21/97	EPA 6010	SMS	7440-62-2	
Date Digested				02/21/97				
Lead, AAS Furnace								
Lead	ND	ug/L	5	02/27/97	EPA 7421	BBF	7439-92-1	
Date Digested				02/21/97				
GC -- Volatiles								
Aromatic Volatile Organics								
Benzene	ND	ug/L	2	02/27/97	EPA 8020	ADS	71-43-2	
Toluene	ND	ug/L	2	02/27/97	EPA 8020	ADS	108-88-3	
Xylene (Total)	ND	ug/L	5	02/27/97	EPA 8020	ADS	1330-20-7	
a,a,a-Trifluorotoluene (S)	106	%		02/27/97	EPA 8020	ADS	2164-17-2	
GC/MS -- Semi-VOA								
Semivolatile Organics								
Naphthalene	ND	ug/L	10	02/24/97	EPA 8270	PAA	91-20-3	
Chrysene	ND	ug/L	10	02/24/97	EPA 8270	PAA	218-01-9	
1-Methylnaphthalene	ND	ug/L	10	02/24/97	EPA 8270	PAA	90-12-0	
Nitrobenzene-d5 (S)	57	%		02/24/97	EPA 8270	PAA	4165-60-0	
2-Fluorobiphenyl (S)	59	%		02/24/97	EPA 8270	PAA	321-60-8	
Terphenyl-d14 (S)	87	%		02/24/97	EPA 8270	PAA	1718-51-0	
Phenol-d6 (S)	54	%		02/24/97	EPA 8270	PAA	13127-88-3	
2-Fluorophenol (S)	47	%		02/24/97	EPA 8270	PAA	367-12-4	
2,4,6-Tribromophenol (S)	61	%		02/24/97	EPA 8270	PAA	118-79-6	
Date Extracted				02/21/97				

REPORT OF LABORATORY ANALYSIS

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Pace Analytical

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

Pace Sample No: 70891023 Date Collected: 02/18/97
Client Sample ID: B Date Received: 02/20/97

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury in Water								
Mercury	ND UJ	ug/L	0.2 UJ	02/24/97	EPA 7470	SMS	7439-97-6	
Arsenic, AAS Furnace								
Arsenic	5.69	ug/L	5	02/25/97	EPA 7060	BBF	7440-38-2	
Date Digested				02/21/97				
Metals, ICP								
Chromium	ND	ug/L	7	02/21/97	EPA 6010	SMS	7440-47-3	
Nickel	ND	ug/L	30	02/21/97	EPA 6010	SMS	7440-02-0	
Vanadium	ND	ug/L	12	02/21/97	EPA 6010	SMS	7440-62-2	
Date Digested				02/21/97				
Lead, AAS Furnace								
Lead	ND	ug/L	5	02/27/97	EPA 7421	BBF	7439-92-1	
Date Digested				02/21/97				
GC -- Volatiles								
Aromatic Volatile Organics								
Benzene	ND	ug/L	2	02/27/97	EPA 8020	ADS	71-43-2	
Toluene	ND	ug/L	2	02/27/97	EPA 8020	ADS	108-88-3	
Xylene (Total)	ND	ug/L	5	02/27/97	EPA 8020	ADS	1330-20-7	
a,a,a-Trifluorotoluene (S)	108	%		02/27/97	EPA 8020	ADS	2164-17-2	
GC/MS -- Semi-VOA								
Semivolatile Organics								
Naphthalene	ND	ug/L	10	02/24/97	EPA 8270	PAA	91-20-3	
Chrysene	ND	ug/L	10	02/24/97	EPA 8270	PAA	218-01-9	
1-Methylnaphthalene	ND	ug/L	10	02/24/97	EPA 8270	PAA	90-12-0	
Nitrobenzene-d5 (S)	68	%		02/24/97	EPA 8270	PAA	4165-60-0	
2-Fluorobiphenyl (S)	71	%		02/24/97	EPA 8270	PAA	321-60-8	
Terphenyl-d14 (S)	83	%		02/24/97	EPA 8270	PAA	1718-51-0	
Phenol-d6 (S)	62	%		02/24/97	EPA 8270	PAA	13127-88-3	
2-Fluorophenol (S)	42	%		02/24/97	EPA 8270	PAA	367-12-4	
2,4,6-Tribromophenol (S)	76	%		02/24/97	EPA 8270	PAA	118-79-6	
Date Extracted				02/21/97				

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Fax: 707-792-0342

Pace Analytical

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

Pace Sample No: 70891031 Date Collected: 02/18/97
Client Sample ID: TRIP BLANK Date Received: 02/20/97

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
GC -- Volatiles								
Aromatic Volatile Organics								
Benzene	ND	ug/L	2	02/28/97	EPA 8020	ADS	71-43-2	
Toluene	ND	ug/L	2	02/28/97	EPA 8020	ADS	108-88-3	
Xylene (Total)	ND	ug/L	5	02/28/97	EPA 8020	ADS	1330-20-7	
a,a,a-Trifluorotoluene (S)	105	%		02/28/97	EPA 8020	ADS	2164-17-2	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Fax: 707-792-0342

Pace Analytical

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

Pace Sample No: 70891056 Date Collected: 02/19/97
Client Sample ID: C Date Received: 02/20/97

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury in Water								
Mercury	ND UJ	ug/L	0.2 UJ	02/24/97	EPA 7470	SMS	7439-97-6	
Arsenic, AAS Furnace								
Arsenic	5.85	ug/L	5	02/25/97	EPA 7060	BBF	7440-38-2	
Date Digested				02/21/97				
Metals, ICP								
Chromium	ND	ug/L	7	02/21/97	EPA 6010	SMS	7440-47-3	
Nickel	ND	ug/L	30	02/21/97	EPA 6010	SMS	7440-02-0	
Vanadium	ND	ug/L	12	02/21/97	EPA 6010	SMS	7440-62-2	
Date Digested				02/21/97				
Lead, AAS Furnace								
Lead	ND	ug/L	5	02/27/97	EPA 7421	BBF	7439-92-1	
Date Digested				02/21/97				
GC -- Volatiles								
Aromatic Volatile Organics								
Benzene	ND	ug/L	2	02/28/97	EPA 8020	ADS	71-43-2	
Toluene	ND	ug/L	2	02/28/97	EPA 8020	ADS	108-88-3	
Xylene (Total)	ND	ug/L	5	02/28/97	EPA 8020	ADS	1330-20-7	
a,a,a-Trifluorotoluene (S)	105	%		02/28/97	EPA 8020	ADS	2164-17-2	
GC/MS -- Semi-VOA								
Semivolatile Organics								
Naphthalene	ND	ug/L	10	02/24/97	EPA 8270	PAA	91-20-3	
Chrysene	ND	ug/L	10	02/24/97	EPA 8270	PAA	218-01-9	
1-Methylnaphthalene	ND	ug/L	10	02/24/97	EPA 8270	PAA	90-12-0	
Nitrobenzene-d5 (S)	76	%		02/24/97	EPA 8270	PAA	4165-60-0	
2-Fluorobiphenyl (S)	78	%		02/24/97	EPA 8270	PAA	321-60-8	
Terphenyl-d14 (S)	81	%		02/24/97	EPA 8270	PAA	1718-51-0	
Phenol-d6 (S)	72	%		02/24/97	EPA 8270	PAA	13127-88-3	
2-Fluorophenol (S)	57	%		02/24/97	EPA 8270	PAA	367-12-4	
2,4,6-Tribromophenol (S)	81	%		02/24/97	EPA 8270	PAA	118-79-6	
Date Extracted				02/21/97				

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1455 McDowell Blvd. North, Suite D
Petaluma, CA 94954
Tel: 707-792-1865
Fax: 707-792-0342

Pace Analytical

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

Pace Sample No: 70891064 Date Collected: 02/19/97
Client Sample ID: FB Date Received: 02/20/97

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
GC -- Volatiles								
Aromatic Volatile Organics								
Benzene	ND	ug/L	2	02/28/97	EPA 8020	ADS	71-43-2	
Toluene	ND	ug/L	2	02/28/97	EPA 8020	ADS	108-88-3	
Xylene (Total)	ND	ug/L	5	02/28/97	EPA 8020	ADS	1330-20-7	
a,a,a-Trifluorotoluene (S)	105	%		02/28/97	EPA 8020	ADS	2164-17-2	
GC/MS -- Semi-VOA								
Semivolatile Organics								
Naphthalene	ND	ug/L	10	02/24/97	EPA 8270	PAA	91-20-3	
Chrysene	ND	ug/L	10	02/24/97	EPA 8270	PAA	218-01-9	
1-Methylnaphthalene	ND	ug/L	10	02/24/97	EPA 8270	PAA	90-12-0	
Nitrobenzene-d5 (S)	57	%		02/24/97	EPA 8270	PAA	4165-60-0	
2-Fluorobiphenyl (S)	55	%		02/24/97	EPA 8270	PAA	321-60-8	
Terphenyl-d14 (S)	85	%		02/24/97	EPA 8270	PAA	1718-51-0	
Phenol-d6 (S)	49	%		02/24/97	EPA 8270	PAA	13127-88-3	
2-Fluorophenol (S)	45	%		02/24/97	EPA 8270	PAA	367-12-4	
2,4,6-Tribromophenol (S)	61	%		02/24/97	EPA 8270	PAA	118-79-6	
Date Extracted				02/21/97				

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1455 McDowell Blvd. North, Suite D
Petaluma, CA 94954
Tel: 707-792-1865
Fax: 707-792-0342

Pace Analytical

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

Pace Sample No: 70891106 Date Collected: 02/19/97
Client Sample ID: D Date Received: 02/20/97

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
Metals								
Mercury in Water								
Mercury	ND UJ	ug/L	0.2 UJ	02/24/97	EPA 7470	SMS	7439-97-6	
Arsenic, AAS Furnace								
Arsenic	ND	ug/L	5	02/25/97	EPA 7060	BBF	7440-38-2	
Date Digested				02/21/97				
Metals, ICP								
Chromium	ND	ug/L	7	02/21/97	EPA 6010	SMS	7440-47-3	
Nickel	ND	ug/L	30	02/21/97	EPA 6010	SMS	7440-02-0	
Vanadium	ND	ug/L	12	02/21/97	EPA 6010	SMS	7440-62-2	
Date Digested				02/21/97				
Lead, AAS Furnace								
Lead	ND	ug/L	5	02/27/97	EPA 7421	BBF	7439-92-1	
Date Digested				02/21/97				
GC -- Volatiles								
Aromatic Volatile Organics								
Benzene	ND	ug/L	2	02/28/97	EPA 8020	ADS	71-43-2	
Toluene	ND	ug/L	2	02/28/97	EPA 8020	ADS	108-88-3	
Xylene (Total)	ND	ug/L	5	02/28/97	EPA 8020	ADS	1330-20-7	
a,a,a-Trifluorotoluene (S)	121	%		02/28/97	EPA 8020	ADS	2164-17-2	
GC/MS -- Semi-VOA								
Semivolatile Organics								
Naphthalene	ND	ug/L	10	02/24/97	EPA 8270	PAA	91-20-3	
Chrysene	ND	ug/L	10	02/24/97	EPA 8270	PAA	218-01-9	
1-Methylnaphthalene	ND	ug/L	10	02/24/97	EPA 8270	PAA	90-12-0	
Nitrobenzene-d5 (S)	68	%		02/24/97	EPA 8270	PAA	4165-60-0	
2-Fluorobiphenyl (S)	69	%		02/24/97	EPA 8270	PAA	321-60-8	
Terphenyl-d14 (S)	81	%		02/24/97	EPA 8270	PAA	1718-51-0	
Phenol-d6 (S)	64	%		02/24/97	EPA 8270	PAA	13127-88-3	
2-Fluorophenol (S)	54	%		02/24/97	EPA 8270	PAA	367-12-4	
2,4,6-Tribromophenol (S)	79	%		02/24/97	EPA 8270	PAA	118-79-6	
Date Extracted				02/21/97				

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1455 McDowell Blvd. North, Suite D
Petaluma, CA 94954
Tel: 707-792-1865
Fax: 707-792-0342

Pace Analytical

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

Pace Sample No: 70891148 Date Collected: 02/19/97
Client Sample ID: TRIP BLANK Date Received: 02/20/97

Parameters	Results	Units	PRL	Analyzed	Method	Analyst	CAS#	Footnotes
GC -- Volatiles								
Aromatic Volatile Organics								
Benzene	ND	ug/L	2	02/28/97	EPA 8020	ADS	71-43-2	
Toluene	ND	ug/L	2	02/28/97	EPA 8020	ADS	108-88-3	
Xylene (Total)	ND	ug/L	5	02/28/97	EPA 8020	ADS	1330-20-7	
a,a,a-Trifluorotoluene (S)	107	%		02/28/97	EPA 8020	ADS	2164-17-2	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1455 McDowell Blvd. North, Suite D
Petaluma, CA 94954
Tel: 707-792-1865
Fax: 707-792-0342

Pace Analytical

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

PARAMETER FOOTNOTES

ND	Not Detected
NC	Not Calculable
PRL	Pace Reporting Limit
(S)	Surrogate

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1455 McDowell Blvd. North, Suite D
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Fax: 707-792-0342

Pace Analytical

QUALITY CONTROL DATA

Chevron Products Co.
Hawaii Refinery
91-480 Malakole Street
Kapolei, HI 96707

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

Attn: Mr. Stan Sato
Phone: 808 682-2205

QC Batch ID: 21671
QC Batch Method: EPA 3010
Analysis Method: EPA 6010
Analysis Description: Metals, ICP
Associated Pace Samples: 70890983 70891007 70891015 70891023 70891056 70891106

METHOD BLANK: 70891494
Associated Pace Samples: 70890983 70891007 70891015 70891023 70891056 70891106

Parameter	Units	Method Blank Result	PRL	Footnotes
Chromium	ug/L	ND	7	
Nickel	ug/L	ND	30	
Vanadium	ug/L	ND	12	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 70893243 70893250

Parameter	Units	70890983	Spike Conc.	Matrix Spike Result	Spike % Rec	Matrix Sp. Dup. Result	Spike Dup % Rec	RPD	Footnotes
Chromium	ug/L	1.469	2000	1756	87.7	1787	89.3	2	
Nickel	ug/L	0	2000	1780	89.0	1829	91.5	3	
Vanadium	ug/L	1.402	2000	1855	92.7	1888	94.3	2	

LABORATORY CONTROL SAMPLE & LCSD: 70893227 70893235

Parameter	Units	Spike Conc.	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Chromium	ug/L	2000	1907	95.4	1931	96.6	1	
Nickel	ug/L	2000	1976	98.8	1982	99.1	0	
Vanadium	ug/L	2000	1987	99.4	2007	100	1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1455 McDowell Blvd. North, Suite D
Petaluma, CA 94954
Tel: 707-792-1865
Fax: 707-792-0342

Pace Analytical

QUALITY CONTROL DATA

DATE: 02/28/97
PAGE: 13

Chevron Products Co.
Hawaii Refinery
91-480 Malakole Street
Kapolei, HI 96707

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

Attn: Mr. Stan Sato
Phone: 808 682-2205

QC Batch ID: 21672
QC Batch Method: EPA 3020
Analysis Method: EPA 7060
Analysis Description: Arsenic, AAS Furnace
Associated Pace Samples: 70890983 70891007 70891015 70891023 70891056 70891106

METHOD BLANK: 70891544
Associated Pace Samples:
70890983 70891007 70891015 70891023 70891056 70891106

Parameter	Units	Method Blank Result	PRL	Footnotes
Lead	ug/L	ND	5	
Arsenic	ug/L	ND	5	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 70891577 70891585

Parameter	Units	70891155	Spike Conc.	Matrix Spike Result	Spike % Rec	Matrix Sp. Dup. Result	Spike Dup % Rec	RPD	Footnotes
Arsenic	ug/L	2.530	40	40.18	94.1	40.36	94.6	1	
Lead	ug/L	5.480	40	32.51	67.6	36.29	77.0	13	1

LABORATORY CONTROL SAMPLE & LCSD: 70891551 70891569

Parameter	Units	Spike Conc.	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Lead	ug/L	40	37.85	94.6	39.13	97.8	3	
Arsenic	ug/L	40	40.90	102	40.73	102	0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Pace Analytical

QUALITY CONTROL DATA

Chevron Products Co.
Hawaii Refinery
91-480 Malakole Street
Kapolei, HI 96707

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

Attn: Mr. Stan Sato
Phone: 808 682-2205

QC Batch ID: 21687
QC Batch Method: EPA 7470
Analysis Method: EPA 7470
Analysis Description: Mercury in Water
Associated Pace Samples: 70890983 70891007 70891015 70891023 70891056 70891106

METHOD BLANK: 70892468
Associated Pace Samples:
70890983 70891007 70891015 70891023 70891056 70891106

Parameter	Units	Method Blank Result	PRL	Footnotes
Mercury	ug/L	ND	0.2	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 70895719 70895727

Parameter	Units	70890983	Spike Conc.	Matrix Spike Result	Spike % Rec	Matrix Sp. Dup. Result	Spike Dup % Rec	RPD	Footnotes
Mercury	ug/L	0	2.0	0.8400	42.0	0.8700	43.5	4	1

LABORATORY CONTROL SAMPLE & LCSD: 70895693 70895701

Parameter	Units	Spike Conc.	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Mercury	ug/L	2.0	2.120	106	2.110	106	0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1455 McDowell Blvd. North, Suite D
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Pace Analytical

QUALITY CONTROL DATA

Chevron Products Co.
Hawaii Refinery
91-480 Malakole Street
Kapolei, HI 96707

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

Attn: Mr. Stan Sato
Phone: 808 682-2205

QC Batch ID: 21699
QC Batch Method: EPA 3520
Analysis Method: EPA 8270
Analysis Description: Semivolatile Organics
Associated Pace Samples: 70890983 70891007 70891015 70891023 70891056 70891064 70891106

METHOD BLANK: 70893151
Associated Pace Samples:
70890983 70891007 70891015 70891023 70891056 70891064 70891106

Parameter	Units	Method Blank Result	PRL	Footnotes
1-Methylnaphthalene	ug/L	ND	10	
Naphthalene	ug/L	ND	10	
Chrysene	ug/L	ND	10	
2-Fluorophenol (S)	%	44		
Phenol-d6 (S)	%	50		
Nitrobenzene-d5 (S)	%	55		
2-Fluorobiphenyl (S)	%	53		
2,4,6-Tribromophenol (S)	%	61		
Terphenyl-d14 (S)	%	83		

LABORATORY CONTROL SAMPLE & LCSD: 70893169 70893177

Parameter	Units	Spike Conc.	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
2-Fluorophenol (S)				67		51		
Phenol-d6 (S)				69		71		
Nitrobenzene-d5 (S)				79		84		
2-Fluorobiphenyl (S)				74		78		
2,4,6-Tribromophenol (S)				77		80		
Terphenyl-d14 (S)				87		88		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Pace Analytical

QUALITY CONTROL DATA

DATE: 02/28/97

Chevron Products Co.
Hawaii Refinery
91-480 Malakole Street
Kapolei, HI 96707

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

Attn: Mr. Stan Sato
Phone: 808 682-2205

QC Batch ID: 21825
QC Batch Method: EPA 8020
Analysis Method: EPA 8020
Analysis Description: Aromatic Volatile Organics
Associated Pace Samples: 70890983 70891007 70891015 70891023 70891031 70891056 70891064 70891106 70891148

METHOD BLANK: 70897632
Associated Pace Samples: 70890983 70891007 70891015 70891023 70891031 70891056 70891064 70891106 70891148

Parameter	Units	Method Blank Result	PRL	Footnotes
Benzene	ug/L	ND	2	
Toluene	ug/L	ND	2	
Xylene (Total)	ug/L	ND	5	
a,a,a-Trifluorotoluene (S)	%	104		

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 70897665 70897673

Parameter	Units	70893532	Spike Conc.	Matrix Spike Result	Spike % Rec	Matrix Sp. Dup. Result	Spike Dup % Rec	RPD	Footnotes
Benzene	ug/L	0.2116	20	17.62	87.0	17.92	88.5	2	
Toluene	ug/L	0.2602	20	16.82	82.8	17.23	84.8	2	
Xylene (Total)	ug/L	1.005	60	54.82	89.7	53.26	87.1	3	
a,a,a-Trifluorotoluene (S)					107		103		

LABORATORY CONTROL SAMPLE & LCSD: 70897640 70897657

Parameter	Units	Spike Conc.	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
Benzene	ug/L	20	17.52	87.6	17.60	88.0	0	
Toluene	ug/L	20	16.68	83.4	16.49	82.5	1	
Xylene (Total)	ug/L	60	55.14	91.9	52.52	87.5	5	

COPY

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1455 McDowell Blvd. North, Suite D
Petaluma, CA 94954
Tel: 707-792-1865
Fax: 707-792-0342

Pace Analytical

QUALITY CONTROL DATA

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

LABORATORY CONTROL SAMPLE & LCSD: 70897640 70897657

Parameter	Units	Spike Conc.	LCS Result	Spike % Rec	LCSD Result	Spike Dup % Rec	RPD	Footnotes
a,a,a-Trifluorotoluene (S)				99		97		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1455 McDowell Blvd. North, Suite D
Petaluma, CA 94954
Tel: 707-792-1865
Fax: 707-792-0342

Pace Analytical

Pace Project Number: 707759
Client Project ID: LTF GW - 1st Qtr 1997E/7021807

QUALITY CONTROL DATA PARAMETER FOOTNOTES

Consistent with EPA guidelines unrounded concentrations are displayed and have been used to calculate % Rec and RPD values.

ND	Not Detected
NC	Not Calculable
PRL	Pace Reporting Limit
RPD	Relative Percent Difference
(S)	Surrogate
[1]	The spike recovery was outside acceptance limits for the MS and /or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.

REPORT OF LABORATORY ANALYSIS

369218

Pace Analytical

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: Chevron Hawaii Refinery
Address: 91-480 Malakole Street
Kapolei, Hawaii 96707
Phone: (808) 682-2205

Report To: Stan Sato
Bill To: Stan Sato
P.O. # / Billing Reference:
Project Name / No.: LTF 1st Qtr. G.W. Sampling

Pace Client No.:
Pace Project Manager: RHC
Pace Project No.: 707759
*Requested Due Date:

Sampled By (PRINT): M. Dalesandro / Zuni Shen
Sampler Signature: M. Dalesandro / Zuni Shen
Date Sampled: 2/18/97

Bel tracking #: C 7021807

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	UNPRESERVED	H_2SO_4	HNO_3	VOA			VOAs	PAHs	Metals	Temp. Blank	REMARKS
1	A	1045	W	70890983	2				✓			✓				"B" * All metals samples received @ pH 7. Samples preserved upon receipt in lab. RL 2/25/97
2	A	1045	↓	↓	2	✓							✓			
3	A	1045			1			✓						✓		
4	E	1130		70891007	2				✓			✓				
5	E	1130		↓	2	✓							✓			
6	E	1130			1			✓						✓		
7	EB	1030		70891015	2				✓			✓				
8	EB	1030	↓	↓	2	✓							✓			

COPY

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT/DATE	SHIPMENT METHOD RETURNED/DATE

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	M. Dalesandro / Dames & Moore	Lynette Haga BEL	2/18/97	1409
	Lynette Haga 2/19/97 1300 Fedex	Fedex		
	Fedex	T. MAWARIS	2/20/97	1000

Additional Comments

COOLER TEMPERATURE 6 °C
BI

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ORIGINAL

SEE REVERSE SIDE FOR INSTRUCTIONS

369217

Pace Analytical

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: Chevron Hawaii Refinery
Address: 91-480 Malakole Street, Kapolei, Hawaii 96707
Phone: (808) 682-2205

Report To: Stan Sato
Bill To: Stan Sato
P.O. # / Billing Reference:
Project Name / No.: LTF 1st Qtr. G.W. Sampling

Pace Client No.:
Pace Project Manager: RMC
Pace Project No.: 707759
*Requested Due Date:

Sampled By (PRINT): M. Dalesandro / Zuy Shen
Sampler Signature: M. Dalesandro
Date Sampled: 2/18/97

Analyses Request: VOAs, PAHs, Metals, Temp Blank

Remarks: Fed tracking # E7021807

COPY

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	UNPRESERVED	H_2SO_4	HNO_3	VOA			VOAs	PAHs	Metals	Temp Blank	REMARKS
1	EB	1030	W	70891015	1			✓						✓		
2	B	1215	↓	70891023	2				✓			✓				
3	B	1215	↓	↓	2	✓							✓			
4	B	1215	↓	↓	1			✓						✓		
5	Temp Blank		↓		1										✓	Temp at 6°C
6	Trip Blank		↓	70891031	1				✓			✓				
7																
8																

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT/DATE	RETURNED/DATE

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	M. Dalesandro / Dames & Moore	Lynette Higa / BEL	2/18/97	1409
	Lynette Higa	FedEx	2/19/97	1300
	FedEx	T Malinaris	2/20/97	1000

Additional Comments

COOLER CUSTODY ...

COOLER TEMPERATURE 6 °C

2 of 2

ORIGINAL

SEE REVERSE SIDE FOR INSTRUCTIONS

Pace Analytical

369222

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: Chevron Hawaii Refinery
Address: 91-480 Malakole Street
Kapolei, Hawaii 96707
Phone: (808) 682-2205

Report To: Stan Sato
Bill To: Stan Sato
P.O. # / Billing Reference
Project Name / No.: LTF 1st Qtr. G.W. Sampling

Pace Client No.
Pace Project Manager: RMC
Pace Project No.: 707759
*Requested Due Date:

Sampled By (PRINT): M. Dalesandro / Zuy Shen
Sampler Signature: M. Dalesandro
Date Sampled: 2/19/97

Remarks: Fed tracking # E762196...

COPY

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	UNPRESERVED	H_2SO_4	HNO_3	VOA			VOAs	PAHs	Metals	REMARKS
1	C	0940	W	~~70891049~~ 70891056	2				✓			✓			
2	C	0940	↓	↓	2	✓							✓		
3	C	0940	↓	↓	1			✓						✓	
4	FB	0915	↓	70891064	2				✓			✓			
5	FB	0915	↓	↓	2	✓							✓		
6	D	1040	↓	~~70891080~~ 70891106	2				✓			✓			
7	D	1040	↓	↓	2	✓							✓		
8	D	1040	↓	↓	1			✓						✓	

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT/DATE	SHIPMENT METHOD RETURNED/DATE

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	M. Dalesandro / Dames + Moore	Lynette Higa 2/19/97	2/19/97	
	Lynette Higa 2/19/97 Lynette Higa 1300	Lynette Higa 1310		
	Fed ex	Fedex		
		T. Mawakas	2/20/97	1000

Additional Comments

COOLER CUSTODY SEALS INTACT ☐ NOT INTACT ☐

COOLER TEMPERATURE 6 °C

ORIGINAL

SEE REVERSE SIDE FOR INSTRUCTIONS

369223

Pace Analytical

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: Chevron Hawaii Refinery
Address: 91-480 Malakole Street
Kapolei, Hawaii 96707
Phone: (808) 682-2205

Report To: Stan Sato
Bill To: Stan Sato
P.O. # / Billing Reference
LTF 1st Qtr. G.W. Sampling
Project Name / No.

Pace Client No.
Pace Project Manager: RMC
Pace Project No.: 707759
*Requested Due Date:

Sampled By (PRINT): M. Dalesandro / Zuyi Shen
Sampler Signature: M. Dalesandro
Date Sampled: 2/19/97

Preservatives: Unpreserved, H_2SO_4, HNO_3, VOA
Analyses Request: VOAs, Temp. Blank

Remarks: Bel tracking # E702?902

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	UNPRESERVED	VOAs	Temp. Blank	REMARKS
1	Trip Blank			70891148	1	✓	✓		
2	Temperature Blank				1	✓		✓	Temp at 6°C
3									
4									
5									
6									
7									
8									

COPY

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT/DATE	RETURNED/DATE

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	M. Dalesandro / Dames + Moore	Lynette Hugo 2/19/97	2/19/97	
	Lynette Hugo 2/19/97 1300	Lynette Hugo 1320 Fedex		
	Fed ex	T Mawaris	2/20/97	1000

Additional Comments

COOLER CUSTODY SEALS INTACT ☐ NOT INTACT ☐
COOLER TEMPERATURE 6 °C

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B1
ORIGINAL

SEE REVERSE SIDE FOR INSTRUCTIONS

RECORDS SEPARATOR PAGE

Hawaii
Refinery

TEST REPORT

Tag No.		Test Date	02/19/97
Name of Stock		Requested By	Stan Sato
Shipped From	Dames and Moore	Sample Date	02/18/97 02/19/97
Terminal Location	Hawaii refinery	Voyage No.	
Product	h2o	Sample No.	

ITEM #	SOURCE	PRODUCT	TEST	TEST METHOD	RESULTS
1	A-1	H2O	ph	EPA mthod 150.1	7.18
2	A-2	H20	ph	EPA mthod 150.1	7.11
3	B-1	H20	ph	EPA mthod 150.1	7.31
4	B-2	H20	ph	EPA mthod 150.1	7.24
5	C-1	H20	ph	EPA mthod 150.1	7.14
6	C-2	H20	ph	EPA mthod 150.1	7.19
7	D-1	H20	ph	EPA mthod 150.1	7.19
8	D-2	H20	ph	EPA mthod 150.1	7.17

COMMENTS:

ph buffer solutions calibrations results as tested

4.0 buffer solution =3.97

7.0 buffer solution = 7.01

10.0 buffer solution = 10.07

Neal Nakamatsu
Signed By:

STATIC WATER LEVEL

Well # 12 Code A

Date 2/18/97 Time 0850

Personnel Mike Dalessandro / Zugi Shen

Weather Condition (Temp, sky) 80°F, Clear

~~Water Tester Model~~ Sampling Pump SP402 ~~SPT~~ Reading : 0

Sounder Make and Model : Oil Recovery System Model 100 EN/M

Well Casing ID 4.0 Well Condition Good

Well Gaging

Casing Top Elevation (TE) 10.89

Depth to Floating Immiscibles (FI) none

Depth to Water (DW) 9.94

Well Gage (TE - DW) 0.95

Depth to Heavy Immiscibles (HI) none

Measured Depth to Bottom (DB) 14.20

Thickness of Floating Immiscibles (DW - FI) none

Height of Water Column, no Heavy Immiscibles (H) = DB - DW 4.26

Height of Water Column, Heavy Immiscibles Present (H)=HI- DW none

1 Casing Volume (CV) = ID x H (.65) 2.77 gallons

Desired Purge Volume (4 CV) 11.08 gallons

PURGE DATA

Date/Time Initiated 2/18/97 / 0945 Date/Time Completed 2/18/97 / 1040

Equipment Used (Peristaltic Pump, Diaphragm Pump, Bailer) Dedicated, pneumatically-operated bladder pump

Total Volume Purged 12.5 gallons

Characteristics of Purge Water Clear

Comments none

Notes:
3.5" Casing ID = 0.50 gal/ft.
4.0" Casing ID = 0.65 gal/ft.

Casing Top Elevations for:
Well # 12 - 10.89 ft.
Well # 26A - 9.88 ft.

Well # 12 Code A
Date 2/18/97 Time ~~0945~~ 1045

Sampling Personnel Mike Palesandro / Zygi Sherer
Purpose of Sampling (Detection, Assessment) Detection
Method of Sampling (Pump, Bailer) Dedicated Pump

Depth to Water: Before Bailing 9.94 Feet Before Sampling 9.95 feet

Sample No.	Code	Parameters	Container Type	Preservative
1	A	VOAs	2 x VOA	HCL
2	A	PAHs	2 x 1-Liter Amber	none
3	A	Metals	1 x 500 ml Plastic	HNO_3
4	E	VOAs	2 x VOA	HCL
5	E	PAHs	2 x 1-Liter Amber	none
6	E	Metals	1 x 500 ml Plastic	HNO_3
7	EB	VOAs	2 x VOA	HCL
8	EB	PAHs	2 x 1-Liter Amber	none
9	EB	Metals	1 x 500 ml Plastic	HNO_3
10				
11				
12				
13				
14				
15				

Lab Instruments: pH Meter Make : Orion
Model# EA940 Serial # P1013A-M

Lab Calibrations:	1	2	3	4
7.0 Buffer:				
Lab Measurements:	A1	A2		
pH:				

Field Observations:
Temperature 84 (deg. F) Climatic Conditions Clear, Sunny

Condition of Site (Flooded, Dry, etc.) Dry

Sample Transporter: ~~Northern Air Freight~~ Brewer Environmental

Comments:

Duplicate sample (E) and equipment blank (EB) collected at Well # 12.

STATIC WATER LEVEL

Well # 11 Code B

Date 2/18/97 Time 0915

Personnel Mike Dalesandro / Zuy. Shen

Weather Condition (Temp, sky) 81°F, Clear

~~I - W Tester Model~~ Sampling Pump :SP402 ~~grk~~ Reading : 0

Sounder Make and Model : Oil Recovery System Model 100 EN/M

Well Casing ID 4.0 Well Condition Good

Well Gaging

Casing Top Elevation (TE) 11.76

Depth to Floating Immiscibles (FI) none

Depth to Water (DW) 11.02

Well Gage (TE - DW) 0.74

Depth to Heavy Immiscibles (HI) none

Measured Depth to Bottom (DB) 14.65

Thickness of Floating Immiscibles (DW - FI) none

Height of Water Column, no Heavy Immiscibles (H) = DB - DW 3.63

Height of Water Column, Heavy Immiscibles Present (H)=HI- DW none

1 Casing Volume (CV) = ID x H (.65) 2.36 gallons

Desired Purge Volume (4 CV) 9.44 gallons

PURGE DATA

Date/Time Initiated 2/18/97 / 1140 Date/Time Completed 2/18/97 / 1210

Equipment Used (Peristaltic Pump, Diaphragm Pump,Bailer) Dedicated, pneumatically-operated bladder pump

Total Volume Purged 11.0 gallons

Characteristics of Purge Water Clear

Comments None

Notes:
3.5" Casing ID = 0.50 gal/ft.

Casing Top Elevations for:
Well # 12 = 10.88 ft

Well # 11 Code B
Date 2/18/97 Time 1215

Sampling Personnel Mike Dalesandro / Zuyi Shen
Purpose of Sampling (Detection, Assessment) Detection
Method of Sampling (Pump, Bailer) Dedicated Pump

Depth to Water: Before Bailing 11.02 Feet Before Sampling 10.76 Feet

Sample No.	Code	Parameters	Container Type	Preservative
1	B	VOAs	2x VOA	HCl
2	B	PAHs	2x 1-liter Amber	None
3	B	Metals	1x Small Plastic	HNO_3
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Lab Instruments: pH Meter Make : Orion
Model# EA940 Serial # P1013A-M

Lab Calibrations:	1	2	3	4
7.0 Buffer:				
Lab Measurements:	B-1	B-2		
pH:				

Field Observations:
Temperature 84° (deg. F) Climatic Conditions Clear, Sunny

Condition of Site (Flooded, Dry, etc.) Dry

Sample Transporter: ~~Northern Air Freight~~ Brewer Environmental

Comments: None

STATIC WATER LEVEL

Well # 23A Code C

Date 2/18/97 Time 0925

Personnel Mike Dalesandro / Zuyi Shen

Weather Condition (Temp, sky) 82°F, Clear

~~Interface Probe Model~~ Sampling Pump : SP402 GPK Reading : 0

Sounder Make and Model : Oil Recovery System Model 100 EN/M

Well Casing ID 4.0 Well Condition Good

Well Gaging

Casing Top Elevation (TE) 9.63

Depth to Floating Immiscibles (FI) none

Depth to Water (DW) 8.92

Well Gage (TE - DW) 0.71

Depth to Heavy Immiscibles (HI) none

Measured Depth to Bottom (DB) 14.09

Thickness of Floating Immiscibles (DW - FI) none

Height of Water Column, no Heavy Immiscibles (H) = DB - DW 5.17

Height of Water Column, Heavy Immiscibles Present (H)=HI- DW none

1 Casing Volume (CV) = ID x H (.65) 3.36 gallons

Desired Purge Volume (4 CV) 13.44 gallons

PURGE DATA Well gauging Only

Date/Time Initiated Date/Time Completed

Equipment Used (Peristaltic Pump, ~~Diaphragm Pump~~, Bailer) dedicated pneumatically-operated bladder pump

Total Volume Purged

Characteristics of Purge Water

Comments

Notes:
3.5" Casing ID = 0.50 gal/ft.

Casing Top Elevations for:
Well # 12 - 10.89 ft.

STATIC WATER LEVEL

Well # 26A Code D

Date 2/18/97 Time 0930

Personnel Mike Dalessandro / Zuy Shen

Weather Condition (Temp, sky) 84° F, Clear

~~Sampling Pump Tester Model~~ ~~SP402~~ Reading : 0

Sounder Make and Model : Oil Recovery System Model 100 EN/M

Well Casing ID 3.5 Well Condition Good

Well Gaging

Casing Top Elevation (TE) 9.08

Depth to Floating Immiscibles (FI) none

Depth to Water (DW) 8.30

Well Gage (TE - DW) 0.78

Depth to Heavy Immiscibles (HI) none

Measured Depth to Bottom (DB) 14.60

Thickness of Floating Immiscibles (DW - FI) none

Height of Water Column, no Heavy Immiscibles (H) = DB - DW 6.30

Height of Water Column, Heavy Immiscibles Present (H)=HI- DW none

1 Casing Volume (CV) = ID x H 4.10 gallons

Desired Purge Volume (.65) (4 CV) 16.40 gallons

PURGE DATA

Well gauging only

Date/Time Initiated Date/Time Completed

Equipment Used (Peristaltic Pump, Diaphragm Pump, Bailer) Dedicated, pneumatically-operated bladder pump

Total Volume Purged

Characteristics of Purge Water

Comments

Notes:
3.5" Casing ID = 0.50 gal/ft

Casing Top Elevations for:
Well # 13 = 10.00 ft

STATIC WATER LEVEL

Well # 12 Code A

Date 2/19/97 Time 0835

Personnel Mike Dalesandro / Zuyi Shen

Weather Condition (Temp, sky) 78°F, Clear

~~Water Tester Model~~ Sampling Pump :SP402 ~~SN#~~ Reading : 0

Sounder Make and Model : Oil Recovery System Model 100 EN/M

Well Casing ID 4.0 Well Condition Good

Well Gaging

Casing Top Elevation (TE) 10.89

Depth to Floating Immiscibles (FI) none

Depth to Water (DW) 9.81

Well Gage (TE - DW) 1.08

Depth to Heavy Immiscibles (HI) none

Measured Depth to Bottom (DB) 14.20

Thickness of Floating Immiscibles (DW - FI) none

Height of Water Column, no Heavy Immiscibles (H) = DB - DW 4.39

Height of Water Column, Heavy Immiscibles Present (H)=HI- DW none

1 Casing Volume (CV) = ID x H (.65) 2.85 gallons

Desired Purge Volume (4 CV) 11.40 gallons

PURGE DATA Well gauging only

Date/Time Initiated Date/Time Completed

Equipment Used (Peristaltic Pump, Diaphragm Pump, ~~Bailer~~) ~~Dedicated,~~ pneumatically-operated bladder pump

Total Volume Purged

Characteristics of Purge Water

Comments

Notes:
3.5" Casing ID = 0.50 gal/ft.
4.0" Casing ID = 0.65 gal/ft.

Casing Top Elevations for:
Well # 12 - 10.89 ft.
Well # 26A - 9.08 ft.

STATIC WATER LEVEL

Well # 11 Code B

Date 2/19/97 Time 0845

Personnel Mike Dalesandro / Zuyi Shen

Weather Condition (Temp, sky) 79°F, Clear

~~Sampling Pump Tester Model~~ Sampling Pump: SP402 ~~GEK~~ Reading : 0

Sounder Make and Model : Oil Recovery System Model 100 EN/M

Well Casing ID 4.0 Well Condition Good

Well Gaging

Casing Top Elevation (TE) 11.76

Depth to Floating Immiscibles (FI) none

Depth to Water (DW) 10.99

Well Gage (TE - DW) 0.77

Depth to Heavy Immiscibles (HI) none

Measured Depth to Bottom (DB) 14.65

Thickness of Floating Immiscibles (DW - FI) none

Height of Water Column, no Heavy Immiscibles (H) = DB - DW 3.66

Height of Water Column, Heavy Immiscibles Present (H)=HI- DW none

1 Casing Volume (CV) = ID x H (.65) 2.40 gallons

Desired Purge Volume (4 CV) 9.60 gallons

PURGE DATA Well gauging only

Date/Time Initiated _____ Date/Time Completed _____

Equipment Used (Peristaltic Pump, Diaphragm Pump, Bailer) Dedicated, pneumatically-operated bladder pump

Total Volume Purged _____

Characteristics of Purge Water _____

Comments _____

Notes:
3.5" Casing ID = 0.50 gal/ft

Casing Top Elevations for:
Well # 12 = 10.88 ft

STATIC WATER LEVEL

Well # 23A Code C

Date 2/19/97 Time 0853

Personnel Mike Dalesandro / Zuy. Shen

Weather Condition (Temp, sky) 80°F, Clear

Sampling Pump ~~Water Meter Model~~ : SP402 ~~WM~~ Reading : 0

Sounder Make and Model : Oil Recovery System Model 100 EN/M

Well Casing ID 4.0 Well Condition Good

Well Gaging

Casing Top Elevation (TE) 9.63

Depth to Floating Immiscibles (FI) none

Depth to Water (DW) 8.87

Well Gage (TE - DW) 0.76

Depth to Heavy Immiscibles (HI) none

Measured Depth to Bottom (DB) 14.09

Thickness of Floating Immiscibles (DW - FI) none

Height of Water Column, no Heavy Immiscibles (H) = DB - DW 5.22

Height of Water Column, Heavy Immiscibles Present (H)=HI- DW none

1 Casing Volume (CV) = ID x H (.65) 3.39 gallons

Desired Purge Volume (4 CV) 13.56 gallons

PURGE DATA

Date/Time Initiated 2/19/97 / 0905 Date/Time Completed 2/19/97 / 0937

Equipment Used (Peristaltic Pump, Diaphragm Pump, Bailer) Dedicated pneumatically-operated bladder pump

Total Volume Purged 15.0 gallons

Characteristics of Purge Water Clear

Comments None

Notes:
3.5" Casing ID = 0.50 gal/ft.
4.0" Casing ID = 0.65 gal/ft.

Casing Top Elevations for:
Well # 12 - 10.89 ft.
Well # 26A - 9.08 ft.

Well # 23 A Code C
Date 2/19/97 Time 0940

Sampling Personnel Mike Dalessandro
Purpose of Sampling (Detection, Assessment) Detection
Method of Sampling (Pump, Bailer) Dedicated Pump

Depth to Water: Before Bailing 8.87 Feet Before Sampling 8.96 Feet

Sample No.	Code	Parameters	Container Type	Preservative
1	C	VOAs	2x VOAs	HCl
2	C	PAHs	2x 1-Liter Amber	None
3	C	metals	1x 500 ml Plastic	HNO_3
4	FB	VOAs	2x VOAs	HCl
5	FB	PAHs	2x 1-Liter Amber	None
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Lab Instruments: pH Meter Make : Orion
Model# EA940 Serial # P1013A-M

Lab Calibrations:	1	2	3	4
7.0 Buffer:				
Lab Measurements:	C-1	C-2		
pH:				

Field Observations:
Temperature 83 (deg. F) Climatic Conditions Clear, Sunny

Condition of Site (Flooded, Dry, etc.) Dry

Sample Transporter: ~~Northern Air Freight~~ Brewer Environmental

Comments:

Field Blank collected From perimeter of 23A

STATIC WATER LEVEL

Well # 26A Code D

Date 2/19/97 Time 0900

Personnel Mike Dalesandro / Zuyi Shen

Weather Condition (Temp, sky) 80°F, Clear

Sampling Pump ~~2 - W Bester Model~~ : SP402 ~~KPK~~ Reading : 0

Sounder Make and Model : Oil Recovery System Model 100 EN/M

Well Casing ID 3.5 Well Condition Good

Well Gaging

Casing Top Elevation (TE) 9.08

Depth to Floating Immiscibles (FI) none

Depth to Water (DW) 8.22

Well Gage (TE - DW) 0.86

Depth to Heavy Immiscibles (HI) none

Measured Depth to Bottom (DB) 14.60

Thickness of Floating Immiscibles (DW - FI) none

Height of Water Column, no Heavy Immiscibles (H) = DB - DW 6.38

Height of Water Column, Heavy Immiscibles Present (H)=HI- DW none

1 Casing Volume (CV) = ID x H (.65) 4.15 gallons

Desired Purge Volume (4 CV) 16.60 gallons

PURGE DATA

Date/Time Initiated 2/19/97/0950 Date/Time Completed 2/19/97/1030

Equipment Used (Peristaltic Pump, Diaphragm Pump, Bailer) Dedicated, pneumatically-operated bladder pump

Total Volume Purged 17.0 gallons

Characteristics of Purge Water Clear

Comments none

Notes:
3.5" Casing ID = 0.50 gal/ft.

Casing Top Elevations for:
Well # 12 - 10.89 ft

Well # 26A Code D
Date 2/19/97 Time 1040

Sampling Personnel Mike Dalesandro / Zung Chen
Purpose of Sampling (Detection, Assessment) Detection
Method of Sampling (Pump, Bailer) Dedicated Pump

Depth to Water: Before Bailing 8.22 Feet Before Sampling 8.35 Feet

Sample No.	Code	Parameters	Container Type	Preservative
1	D	VOAs	2x VOAs	HCl
2	D	PAHs	2x 1-Liter Amber	None
3	D	metals	1x 500ml Plastic	HNO_3
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Lab Instruments: pH Meter Make : Orion
Model# EA940 Serial # P1013A-M

	1	2	3	4
Lab Calibrations: 7.0 Buffer:				
Lab Measurements: pH:	D-1	D-2		

Field Observations:
Temperature 83 (deg. F) Climatic Conditions Clear, Sunny

Condition of Site (Flooded, Dry, etc.) Dry

Sample Transporter: ~~Northern Air Freight~~ Brewer Environmental

Comments: None

RECORDS SEPARATOR PAGE

4

Chevron

March 4, 1996

Chevron Products Company
91-480 Malakole Street
Kapolei, HI 96707

Rick L. Roberts
Manager, Hawaii Refinery
(808) 682-5711

CERTIFIED MAIL NO. P 389 077 407
RETURN RECEIPT REQUESTED

Mr. Jeff Zelikson, Director (H-1)
Hazardous Waste Management Division
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, CA 94105

Annual Report On Groundwater Flow Rate And Direction At Landfarm

Dear Mr. Zelikson:

Attached is the annual report for determining groundwater flow rate and direction in the uppermost aquifer at the Chevron Hawaii Refinery landfarm. The evaluation was conducted to meet condition IV.F.3 of our RCRA Permit (HIT 160 010 005).

If you have any questions, please contact Stan Sato at (808) 682-2205.

Very truly yours,

Rick L. Roberts

SYS

Attachment

cc: Mr. Carl Warren, USEPA
Certified Mail No. P 389 077 403
Return Receipt Requested

Mr. Steven Chang, HDOH
Certified Mail No. P 389 077 406
Return Receipt Requested

DAMES & MOORE
1050 QUEEN STREET, SUITE 204, HONOLULU, HAWAII 96814
(808) 593-1116 FAX: (808) 593-1198

February 29, 1996

Mr. Stan Sato
Chevron U.S.A. Products Company
Hawaii Refinery
91-480 Malakole Street
Honolulu, Hawaii 96707

Groundwater Flow Velocity and Gradient Calculations
Land Treatment Facility
Chevron Hawaii Refinery
91-480 Malakole Street
Kapolei, Oahu, Hawaii
For Chevron U.S. A. Products Company
Job Number 16000-503-037

Dear Mr. Sato:

At your request, Dames & Moore has prepared the following analysis of groundwater conditions at the Chevron Hawaii Refinery (Refinery), Land Treatment Facility (LTF). Included in the scope of this analysis:

- Preparation of groundwater contour maps from the 1995 quarterly monitoring program; and
- Evaluation of groundwater gradient and flow velocity at the LTF.

Groundwater contours from the quarterly monitoring events are included on the attached maps. Review of these maps indicates significant variation in groundwater gradient and flow direction, depending on when the groundwater levels are measured relative to tidal cycles. The groundwater level measurements were all collected within a one-hour period during each monitoring event.

Due to the short term tidal groundwater level fluctuations, we believe that an average gradient approach is more appropriate for evaluation of groundwater flow direction and velocity. Based on average groundwater elevation contours presented in the recent Tidal Investigation, the average gradient for the Refinery was calculated as 0.0002 foot per foot (ft/ft). The average direction of groundwater flow at the LTF is to the west.

The average gradient is used to calculate an average groundwater flow velocity by application of Darcy's equation. Other data needed for this calculation include hydraulic conductivity and effective porosity, both of which are estimated. The Darcy equation is:

$$V = \frac{Ki}{n}$$

Where V = Groundwater Flow Velocity
K = Hydraulic Conductivity
i = Average Hydraulic Gradient, and
n = Effective Porosity.

Based on available site investigation and regional data, the range of values for hydraulic conductivity is estimated at between 0.1 and 1.0 centimeters per second (cm/s), and the effective porosity is between 0.1 and 0.2 (dimensionless). Using these values, the calculated average linear velocity of groundwater flow at the LTF is within the range of from approximately 0.3 to 6 feet per day (ft/d). Based on this calculation, and the estimated range of values of the hydraulic parameters, a value of 1 ft/d is a reasonable estimate of the average linear groundwater flow velocity at the LTF.

We trust that this letter meets your current requirements. Please do not hesitate to call us if you have questions or require additional information.

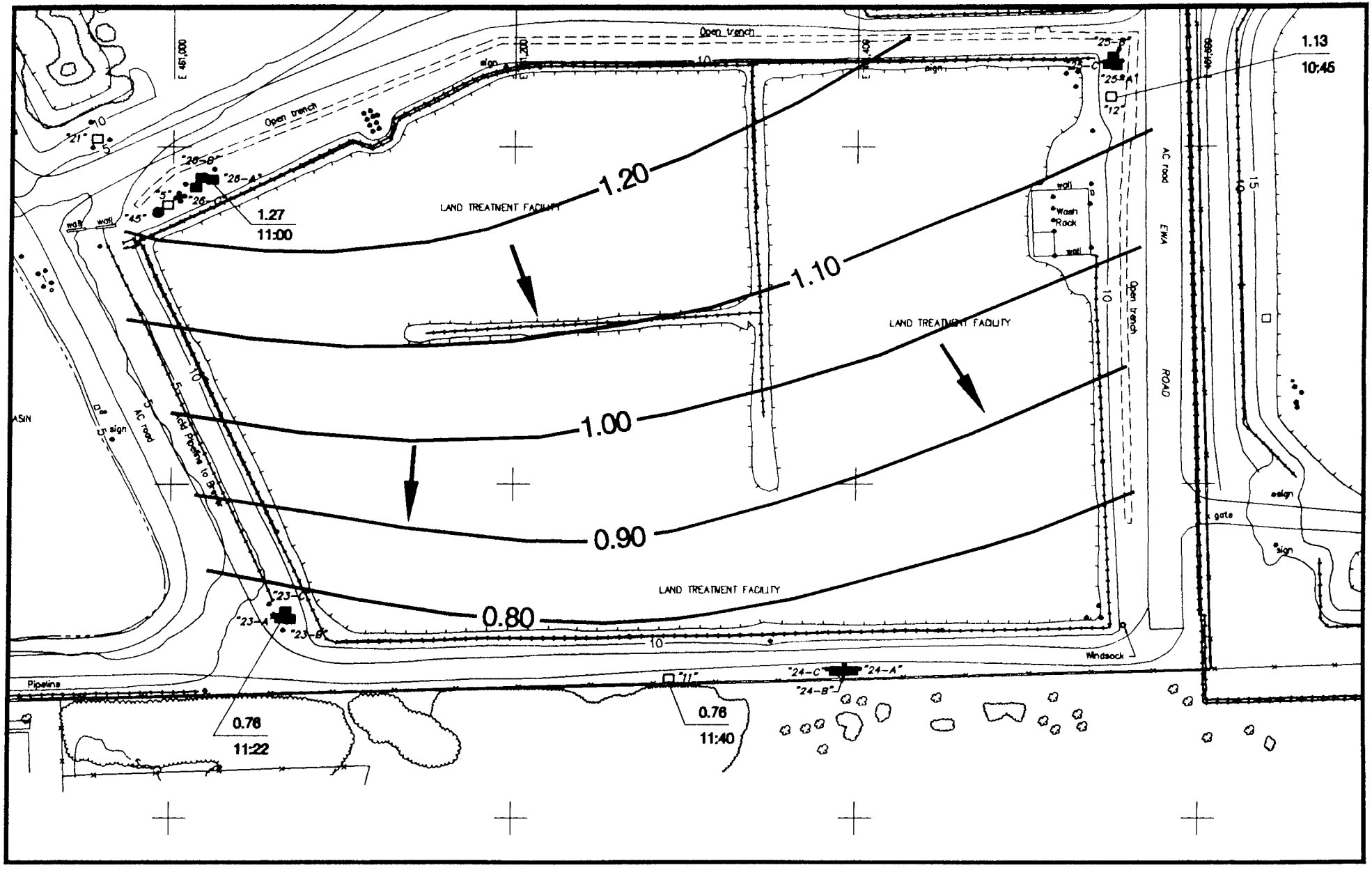
Very truly yours,

DAMES & MOORE

Edward Tschupp, C.E.G.
Senior Hydrogeologist

EWT/ln

Attachments: Potentiometric Surface Maps - March 1, 1995
June 13, 1995
September 12, 1995
November 14, 1995

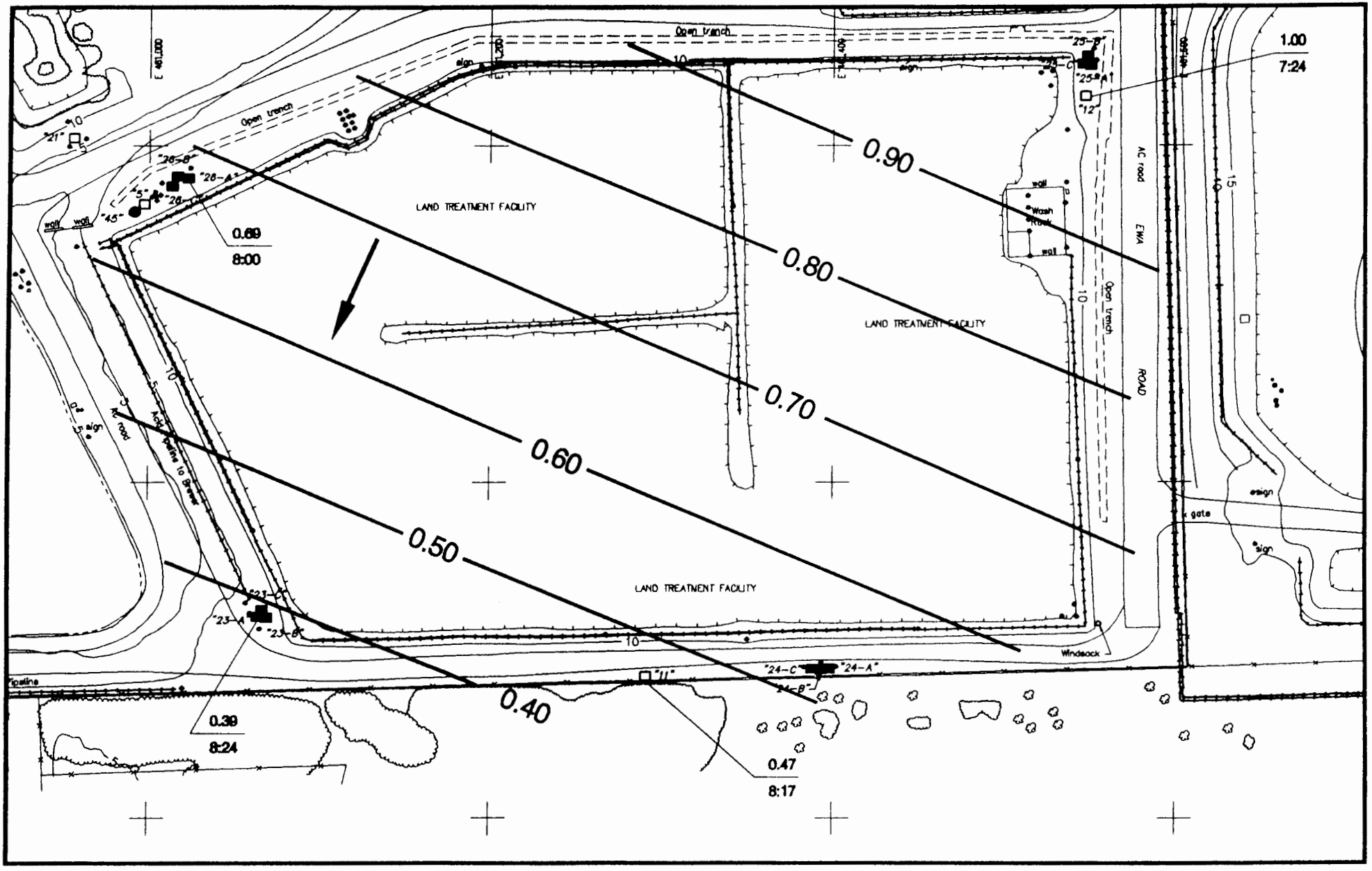


POTENTIOMETRIC SURFACE MAP
MARCH 1, 1995

Chevron Hawaii Refinery
Kapolei, Oahu, Hawaii

DAMES & MOORE

FIGURE 8-1



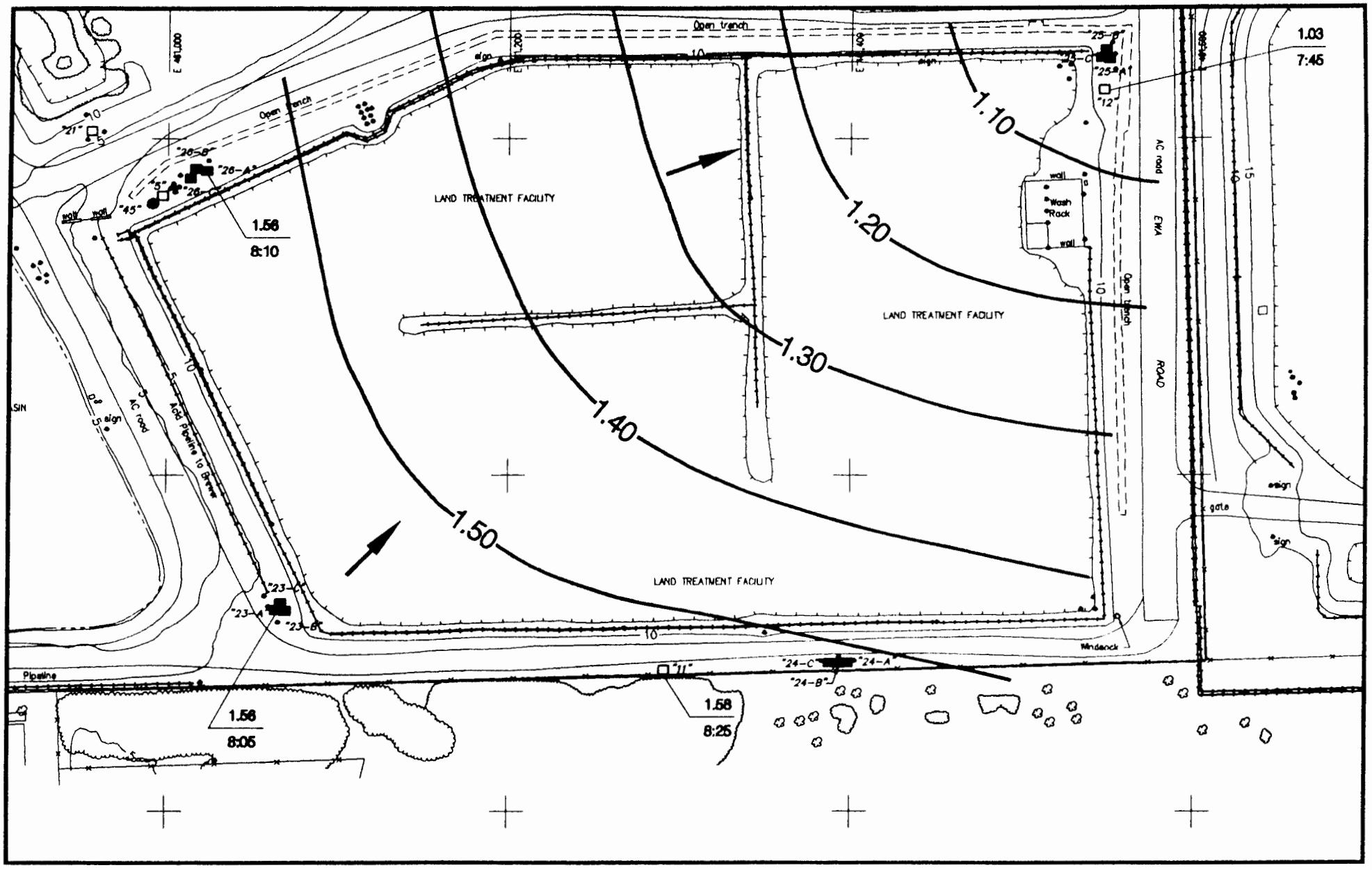
POTENTIOMETRIC SURFACE MAP
JUNE 13, 1995

Chevron Hawaii Refinery
Kapolei, Oahu, Hawaii

DAMES & MOORE

CHEV-15\16000_513\6405-032.JSB JUNE.DWG 2/27/96

FIGURE 8.2



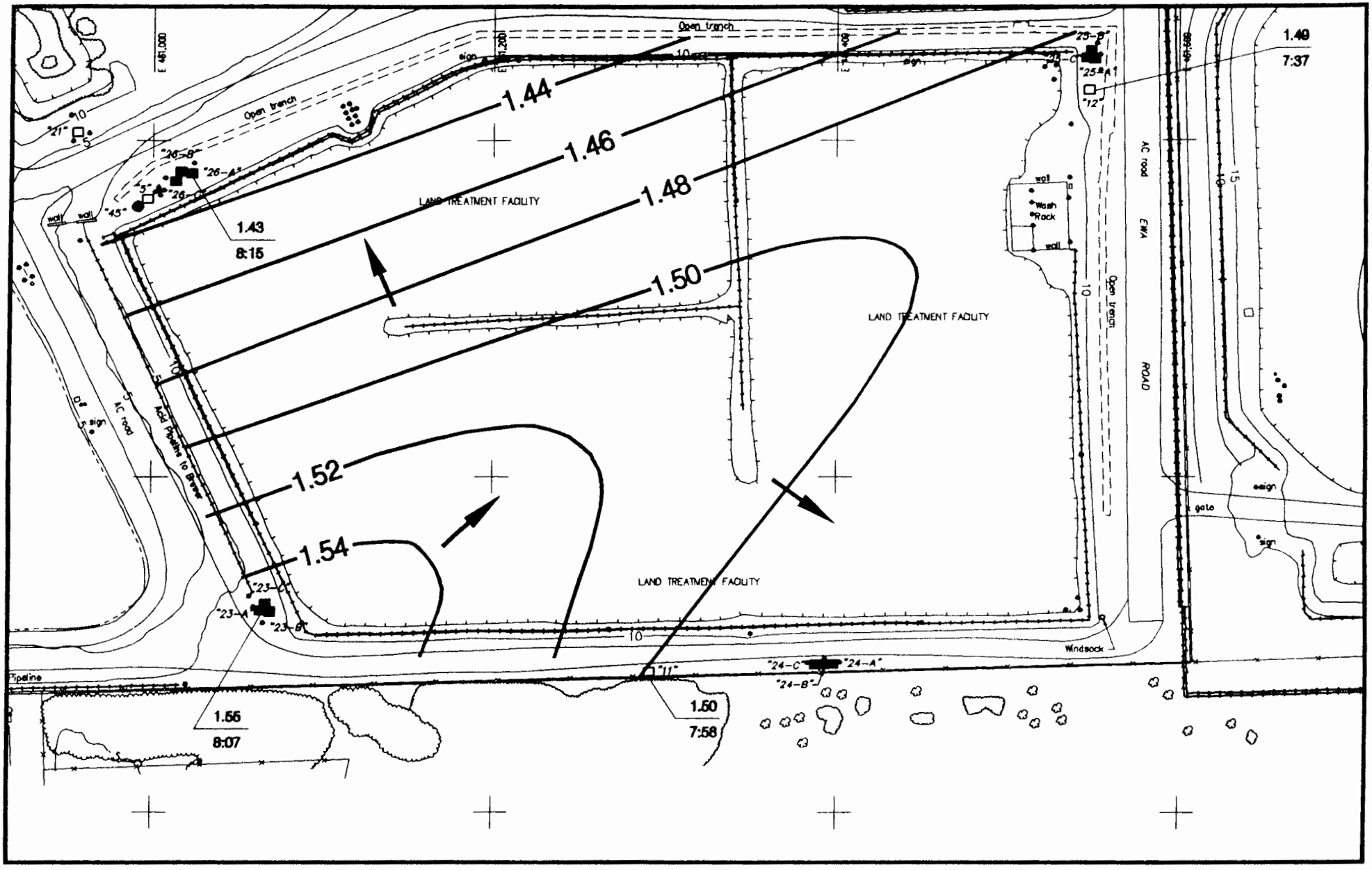
POTENTIOMETRIC SURFACE MAP
SEPTEMBER 12, 1995

CHEVRON HAWAII REFINERY
KAPOLEI, OAHU, HAWAII

FIGURE 8-3

DAMES & MOORE

CHEV-15\16000-513-6405-037.JSP SEPT.DWG 2/26/96



POTENTIOMETRIC SURFACE MAP
NOVEMBER 14, 1995

Chevron Hawaii Refinery
Kapolei, Oahu, Hawaii

DAMES & MOORE

CHEV_15\16000-513_6405_03_JSB_NOV.DWG 2/27/96

FIGURE 8.4

RECORDS SEPARATOR PAGE

Chevron

Chevron U. S. A. Products Company
P.O. Box 29789
Honolulu, HI 96820

Rick L. Roberts
Manager, Hawaii Refinery
(808) 682-5711

October 3, 1994

CERTIFIED MAIL NUMBER: P 101 833 703
RETURN RECEIPT REQUESTED

Ms. Paula Bisson, Chief
Arizona, Nevada, Pacific Islands Section
Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco, California 94105-3901

Chevron Hawaii Refinery
SWMU and Hydrocarbon Plume
Response to EPA Letter of June 16, 1994

Dear Ms. Bisson:

This letter is in response to the June 16, 1994, EPA correspondence which was received by the refinery on June 20, 1994. As requested, we are providing you with the results of the additional Solid Waste Management Unit (SWMU) investigation and the data for the further free hydrocarbon plume characterization.

SWMUs 21 and 22

Additional samples were collected from SWMUs 21 and 22 in order to provide a more representative characterization of the locations. The analysis results for the SWMUs are summarized in Tables 1 and 2. For SWMU 21 (Table 1), the additional analysis results for volatile and semi-volatile organic compounds (VOCs and SVOCs) indicate levels greater than the original data range. However the additional metal analyses for SWMU 21, with the exception of lead in sample location 21201/60-1, are within the original data range. For SWMU 22 (Table 2), the additional VOCs, SVOCs, and metals analysis results are either within or below the original data range (with the exception of Arsenic in locations 22476/20-1 and 22714/42-1).

A letter from the sampling contractor (Woodward-Clyde) to Stan Sato (Chevron) which details the sampling is enclosed as Attachment 1. The additional locations have been added to the final RFI report sample location graphic for clarification (Attachment 2). The complete analytical results for SWMUs 21 and 22 are included as Attachment 3.

SWMU 18

As discussed in our letter of July 25, 1994, we have resubmitted the additional data for SWMU 18L. No further soil sampling has been conducted at the SWMU 18 location (Roland's Pond) because of its status as a Hawaiian Stilt breeding area.

For the SWMU 18 downgradient groundwater sample collection, exploratory wells were drilled along the western and southern edges of the SWMU. Results of the drilling along the western edge (including the southwest corner) of SWMU 18 indicated hydrocarbon contamination, therefore no groundwater monitoring wells were established along the western edge of the SWMU.

Two monitoring wells were established along the southern edge of SWMU 18 where no hydrocarbon was detected. Groundwater samples were collected from the wells and analyzed for the required constituents. The groundwater analysis data which includes results for SWMU 18 is summarized in Table 3. As indicated, all organic constituent analyses were non-detect. Various metals were detected at concentrations of less than 1.0 mg/l.

An Exploratory Drilling report from the contractor (Woodward-Clyde) to Stan Sato (Chevron) is enclosed as Attachment 4. The report includes a graphical representation of the SWMU 18 groundwater monitoring well locations. The complete groundwater sample results are enclosed as Attachment 5.

Background Samples

As discussed in our letter of July 25, 1994, it is our belief that a location within the refinery boundary best represents background levels due to the various sources of contamination in the Campbell Industrial Park. Therefore, the additional background samples were collected from within the refinery in the future tankage area where no development has taken place (see Attachment 6, refinery diagram).

As with the original analysis results, the additional data indicates background concentrations of various metals. The detected concentrations of metals are within the original data range, with the exception of higher chromium and lead levels. There were no detected levels of VOCs or SVOCs in the additional background samples with the exception of Di-n-butyl phthalate at 0.907 mg/kg in sample CHEV-BG1. The complete analysis results are included in Attachment 3. The background sample collection is discussed in the enclosed Woodward-Clyde SWMU 21 and 22 sampling report (Attachment 1).

Rinsate Blanks

As discussed in our letter of July 25, 1994, equipment rinsate blanks were collected per EPA guidelines. One duplicate sample was collected for each data location. Equipment rinsate blanks for SWMUs 21, 22 and groundwater well R5, indicated levels of chloroform present in amounts of the 6.46, 7.87, and 2.36 ug/l, respectively. No chloroform was detected in the actual sample analysis however which indicates potential equipment contamination. Duplicate samples for SWMUs 21 and 22 and groundwater well R5 did not indicate significant differences in detected constituents.

Equipment rinsate blank and duplicate sample analysis results are included in Attachments 3 and 7.

Hydrocarbon Plume

We actively continue to recover subsurface free hydrocarbon on a daily basis through utilization of the refinery subsurface hydrocarbon recovery system. Our future containment and recovery strategy includes the evaluation of plans for a barrier trench in the southwest corner of the refinery to ensure against any potential offsite migration and an assessment of the need for an additional hydrocarbon recovery system.

We will continue to make every effort to provide EPA with information concerning the refinery subsurface hydrocarbon plume. However, we continue to believe that the refinery oily water sewer is not a solid waste management unit. It is our understanding that the EPA's consideration of oily sewer systems as SWMUs has not been stated in a final rule nor has any Court of Appeals ruled on this issue.

As requested, we have collected the additional hydrocarbon plume data. The hydrocarbon thickness data can be found in Table 4 and the groundwater analysis results are summarized in Table 3. As stated in the EPA letter of June 16, 1994, no groundwater analyses were required from wells which contained free hydrocarbon. The complete analysis results are enclosed as Attachment 7.

Results of the upgradient well monitoring are summarized in Tables 3 and 4. As indicated, hydrocarbon thicknesses were present in all but two of the upgradient wells. No water could be detected in upgradient well number 3. During sampling it was reported that the well water level probe felt hot to touch upon retrieval. Well number 3 is located near the marine pipelines which transport crude into the refinery from the offshore tanker mooring. The pipeline is steam heated which is most likely the cause of the probe's elevated temperature.

Stormwater Sewer

We are in the process of inspecting and upgrading our stormwater sewer system. The project is currently in the clean-out and televising phase. Once the sewer as been cleaned and video inspected a decision can be made on any necessary repairs. We are aware of the potential for storm sewer cross-contamination from the hydrocarbon plume. Any potential hydrocarbon entering the storm sewer would be treated via the stormwater API Separator and then discharged into the refinery biological oxidation ponds. After treatment the stormwater is discharged to the ocean under the refinery individual NPDES permit number HI0000329.

Should you have any questions or require further information, please contact Stan Sato at (808) 682-2205 or Susan Colborn at (808)682-2347.

Sincerely,

R L Roberts / DW Koenig

R. L. Roberts

SJC

cc: Tim Stott, EPA Region IX (w/out att.)

Mr. Steven Chang, Chief
Solid Waste Branch
Environmental Management Division
919 Ala Moana Boulevard
Honolulu, Hawaii 96814
Certified Mail: P 084 802 562

Chevron Hawaii Refinery

Table 1

SWMU 21 - Analytical Result Comparison

Parameter	Analyte Concentration/Detection Limit				
Sample Designation	21-1-0.5	21-2-0.5	21112/28-1	21112/28-2	21201/60-1
Sample Date	5/6/93	5/6/93	7/28/94	7/28/94	7/28/94
Sample Matrix	Soil	Soil	Soil	Soil	Soil
Sample Type	Normal	Normal	Normal	Normal	Normal
VOCs (ug/l)					
Total Xylenes	ND	200/100	N/A	N/A	N/A
m+p-xylenes	N/A	N/A	6390/250	3990/250	1560/250
o-xylene	N/A	N/A	4990/250	3580/250	743/250
Ethylbenzene	ND	ND	1720/250	1360/250	415/250
Toluene	ND	ND	351/250	271/250	ND
SVOCs (ug/l)					
Benzenethiol	ND	ND	29800/5200	18500/5200	25600/5200
Chrysene	900/80	360/80	ND	ND	2410/2000
4-Methylchrysene	2200/80	950/80	N/A	N/A	N/A
6-Methylchrysene	N/A	N/A	ND	ND	ND
1-Methylnaphthalene	ND	ND	39800/5200	29400/5200	33300/5200
Naphthalene	ND	ND	5430/2600	4070/2600	2510/2000
Phenanthrene	ND	520/80	11100/5200	9590/5200	14100/5200
Pyrene	ND	350/80	ND	ND	2840/2000
bis(2-ethylexyl)phthalate	ND	1100/80	ND	ND	ND
Metals (mg/l)					
Antimony	ND	ND	ND	ND	ND
Arsenic	4/3	ND	ND	ND	ND
Barium	21/0.3	12/0.5	12.2/1.0	13.2/1.0	12.2/1.0
Beryllium	ND	ND	ND	ND	ND
Cadmium	0.6/0.3	1.3/0.3	1.59/1.00	1.85/1.00	ND
Chromium	65/5	53/5	50.4/2.0	36.6/2.0	42.5/2.0
Cobalt	4.7/0.9	5.9/0.9	3.91/1.00	3.53/1.00	3.95/1.00
Lead	60/10	50/10	106/5	77.3/5.00	444/5.0
Mercury	0.8/0.1	0.6/0.1	2.33/0.100	2.37/0.100	0.941/0.100
Nickel	50/2	140/2	79.1/3.0	91.7/3.0	35.1/3.0
Selenium	4/3	5/3	ND	ND	ND
Vanadium	37/0.5	66/0.5	50.9/1.0	47.3/1.0	45.5/1.0

Chevron Hawaii Refinery

Table 2

SWMU 22 - Analytical Result Comparison

Parameter	Analyte Concentration/Detection Limit					
Sample Designation	22-1-0.5	22-2-0.5	22238/15-2	22241/15-1	22476/20-1	22714/42-1
Sample Date	5/6/93	5/6/93	7/28/94	7/28/94	7/28/94	7/28/94
Sample Matrix	Soil	Soil	Soil	Soil	Soil	Soil
Sample Type	Normal	Normal	Normal	Normal	Normal	Normal
VOCs (ug/l)						
Benzene	ND	ND	860/250	ND	ND	ND
Ethylbenzene	2000/1000	2000/1000	565/250	8010/250	426/250	2200/2000
Total Xylenes	ND	14000/1000	N/A	N/A	N/A	N/A
m+p-xylenes	N/A	N/A	18200/250	8730/250	1690/250	5410/2000
o-xylenes	N/A	N/A	8640/250	10200/250	626/250	4520/2000
Toluene	ND	ND	757/250	ND	ND	ND
SVOCs (ug/l)						
1-Methylnaphthalene	5300/800	110000/8000	94700/2000	34700/2000	3160/2000	ND
Phenanthrene	39000/800	100000/8000	64100/2000	20900/2000	3910/2000	3480/2000
Benzenethiol	42000/800	82000/8000	52600/5200	9010/5200	ND	4340/2000
Flouranthene	2200/80	4500/800	ND	ND	ND	ND
Pyrene	1900/80	16000/800	9110/2600	2940/2000	ND	ND
Butylbenzylphthalate	130/80	ND	ND	ND	ND	ND
bis(2-ethylhexyl)phthalate	2500/80	15000/800	ND	ND	ND	ND
chrysene	4900/800	ND	7270/2600	ND	ND	ND
4-methylchrysene	17000/800	13000/800	N/A	N/A	N/A	N/A
Metals (mg/l)						
Antimony	ND	ND	ND	ND	ND	ND
Arsenic	3/3	4/3	ND	ND	9.08/5.00	8.98/5.00
Barium	14/0.5	28/0.5	14.9/1.0	13.1/1.0	26.1/1.0	22.9/1.0
Beryllium	ND	ND	ND	ND	ND	ND
Cadmium	0.6/0.3	1.1/0.3	1.14/1.00	ND	1.44/1.00	1.36/1.00
Chromium	28/5	53/0.5	133/2	10.2/2.0	26.1/2.0	40.8/2.0
Cobalt	6.2/0.5	9.5/0.9	4.20/1.00	3.98/1.00	3.85/1.00	4.27/1.00
Lead	40/10	210/10	135/5	23.3/5.0	57.3/5.0	38.3/5.0
Mercury	0.5/0.1	4.8/0.1	1.63/0.10	3.62/0.10	1.21/0.10	1.28/0.10
Nickel	510/2	340/2	62.2/3.0	288/3	43.1/3.0	90.5/3.0
Selenium	3/3	5/3	ND	ND	ND	ND
Vanadium	120/0.5	110/0.5	97.1/1.0	141/1	85.6/1.0	67.8/1.0

Chevron Hawaii Refinery

Table 3

Groundwater Analyses

Parameter	Analyte Concentration/Detection Limit										
Sample Designation	CHEV-1	CHEV-R3	CHEV-4	CHEV-10	CHEV-R5	CHEV-31	CHEV-31	CHEV-32	CHEV-34	SWMU18-MW1	SWMU18-MW2
Sample Date	8/4/94	8/4/94	8/4/94	8/4/94	8/4/94	8/4/94	8/4/94	8/4/94	8/4/94	8/24/94	8/24/94
Sample Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Metals (mg/l)											
Antimony	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	.033/.005	ND	.006/.005	.012/.005	.012/.005	.015/.005	.037/.005	.021/.005	.021/.005	.029/.005	.037/.005
Barium	.021/.010	.020/.010	.022/.010	.036/.010	.024/.010	.036/.010	.017/.010	.028/.010	.028/.010	.037/.010	.023/.010
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	ND	ND	.007/.005	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	ND	ND	ND	ND	ND	.075/.020	ND	.023/.020	.023/.020	ND	ND
Cobalt	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead	.065/.050	ND	.064/.050	.066/.050	.070/.050	.062/.050	ND	ND	ND	ND	ND
Mercury	.002/.001	.001/.001	ND	ND	.002/.001	.002/.001	ND	ND	ND	.0005/.0002	.0005/.0002
Nickel	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	ND	ND	ND	ND	ND	.008/.005	.011/.005	ND	ND	ND	ND
Vanadium	ND	ND	ND	.024/.010	ND	.077/.010	.039/.010	.048/.010	.048/.010	.014/.010	.011/.010

Organic analytes were non-detect in all of the groundwater samples collected.

Chevron Hawaii Refinery Hydrocarbon Plume Data

TABLE 4

Well Number	Sample Date	H/C Thickness	Comments
35	29-Jun-94	1.98'	No groundwater analysis required.
R38	29-Jun-94	0.32'	No groundwater analysis required.
R13	29-Jun-94	0.12'	No groundwater analysis required.
R35*	29-Jun-94	0.30'	*This well was previously mislabeled as R33.
R34	29-Jun-94	0.06'	No groundwater analysis required.
R12	29-Jun-94	0.29'	No groundwater analysis required.
RW1	29-Jun-94	0.12'	No groundwater analysis required.
34	30-Jun-94	0.30'	Groundwater analysis attached.
15	29-Mar-94	Sheen	Benzene <0.020 mg/l. See letter of 7/25/94. No hydrocarbon sheen detected on 9/30/94.
33	29-Mar-94	Sheen	Benzene <0.020 mg/l. See letter of 7/25/94. No hydrocarbon sheen detected on 9/30/94.
32	5-Aug-94	Not Detected	Groundwater analysis attached.
9	5-Aug-94	Not Detected	Groundwater analysis attached.
31	5-Aug-94	Not Detected	Groundwater analysis attached.
R5	5-Aug-94	Not Detected	Groundwater analysis attached.
R4	5-Aug-94	Not Detected	Groundwater analysis attached.
R3	5-Aug-94	Not Detected	Groundwater analysis attached.
R10	5-Aug-94	Not Detected	Groundwater analysis attached.
RW4	6-Jul-94	Light Sheen	Upgradient. No groundwater analysis required.
RW5	6-Jul-94	0.03'	Upgradient. No groundwater analysis required.
1	12-Jul-94	Not Detected	Upgradient. Groundwater analysis attached.
2	6-Jul-94	0.14'	Upgradient. No groundwater analysis required.
3	12-Jul-94	Not Detected	Upgradient. No water detected. Not sampled.
4	6-Jul-94	0.88'	Upgradient. No groundwater analysis required.
5	Abandoned.	N/A	Approved permit mod - October 1991.
18	Abandoned.	N/A	Covered by Central Control Building.
19	30-Jun-94	0.33'	Upgradient. No groundwater analysis required.

RECORDS SEPARATOR PAGE

Chevron

Chevron U. S. A. Products Company
P.O. Box 29789
Honolulu, HI 96820

Karl O. Mohn
Manager, Hawaii Refinery
(808) 682-5711

March 31, 1994

Certified Mail Number P 084 802 481
RETURN RECEIPT REQUESTED

Mr. Rich Vaille, Chief
State Programs Branch
U.S. Environmental Protection Agency, Region IX
75 Hawthorne Street
San Francisco, CA 94105

Revised Landfarm Unsaturated Zone
Monitoring Plan (HI 106 010 005)
File: 3.2W.3

Dear Mr. Vaille:

The following is in response to your letter of January 10, 1994, which concerns the unsaturated zone monitoring plan for the refinery Land Treatment Facility. In order to fulfill the Class I permit modification requirements we have revised the plan according to the commentary provided by the EPA.

We would like to request a slight change to EPA comment number five. We ask that the background PHC concentration determination period be changed – from 30 to 45 days after the effective date of the permit modification in order to allow for the increased laboratory analysis turnaround time required for samples sent to the mainland.

Please replace pages one through six of our original Land Treatment Facility unsaturated zone monitoring plan submittal with the enclosed revised pages one through six.

Should you have any questions or require further information, please contact Susan Colborn of our Environmental Staff at (808) 682-2347.

Very truly yours,

K. O. Mohn

SJC
cc: Mr. Tim Stott (H-2-2)
U.S. Environmental Protection Agency, Region IX

Mr. Mike Miyasaka
State of Hawaii Department of Health

PROPOSED PERMIT CONDITIONS

LAND TREATMENT OPERATION AND MAINTENANCE AND UNSATURATED ZONE MONITORING

III.A. DEFINITIONS

For purposes of this Permit, the following concepts and terms will be used:

Principal Hazardous Constituents (PHCs) - Principal hazardous constituents shall be defined as:

Metals:	Nickel
	Lead
	Chromium
	Vanadium
	Arsenic
	Mercury
Volatile Organics:	Benzene
	Xylene
Semivolatile Organics:	Chrysene
	Naphthalene
	1-Methylnaphthalene

Tier I Analyses - a set of analyses to be performed in order to monitor and maintain optimal treatment conditions at the land treatment unit. Specific Tier I constituents and analytical methods are shown in Table III.1.

Tier II Analyses - a set of analyses to be performed in order to identify and quantify the PHCs. Specific analytical methods are shown in Table III.1.

Treatment Zone - (TZ) a soil area of the unsaturated zone of a land treatment unit within which hazardous constituents are degraded, transformed, or immobilized.

Zone of Incorporation (ZOI) - that portion of the treatment zone from the existing soil surface to a depth of 12" below the original soil surface for purposes of surface soil sampling.

Mid Treatment Zone (MTZ) - lower portion of the treatment zone from 12" to the top of coral layer for purposes of soil core sampling.

Below Treatment Zone (BTZ) - the soil-core sampling level below the defined treatment zone for this site extending from 12 to 18" below the bottom of the soil/coral interface. Soil-core lysimeters will also be installed and sampled from this depth.

Landfarm Plot - for operational and monitoring purposes, the land treatment facility shall be divided into three treatment plots (A, B and C) as shown in Figure III.1.

Practical Quantification Limit (PQL) - the lowest level that can be reliably determined within specified limits of precision and accuracy during routine laboratory operating conditions. Calculated as ten times the method detection limit.

Method Detection Limit (MDL) - The minimum concentration of a substance that can be identified, measured and reported with 99% confidence that the analyte concentration is greater than zero. Calculated as the standard deviation times the Student t-value at the desired confidence level.

III. B. OPERATION AND MAINTENANCE

III.B.1. The maximum loading limit shall be 10% total oil and grease, (dry weight basis), as measured by one composite sample of 2 random, discrete ZOI samples from each landfarm plot (for a total of three composite samples to be analyzed). This limit must not be exceeded at any time. The Permittee must determine the loading rate in each plot on a semi-annual basis. A report on this determination shall be prepared and placed in the facility operating record. The report must include a map showing sample locations, as well as composite identifiers and laboratory results. If the allowable loading limit in any composite sample is exceeded, the Permittee must notify the Director within 14 days of such finding and must immediately discontinue use of the plot represented until loading can be maintained below the maximum allowed. The Permittee must notify the Director in writing when the affected plot is to be placed back into service and must report the oil and grease concentration which formed the basis for this decision.

III.B.2. The Permitee shall collect two random, discrete ZOI samples from each landfarm plot (for a total of six samples) determine the concentrations of Tier I and Tier II constituents on a semi-annual basis. The results of these determinations shall be placed in the facility operating record. (Note: maximum reportable method detection limits for Tier II constituents are provided in Table III.2).

III.B.3. Soil amendments will be made when analytical results or other information indicate that the pH should be adjusted or that the actual amount of nitrogen or phosphorus is less than the desired amount identified in Table III.1. At a minimum, this shall be determined on a semi-annual basis. Additives used for pH control are finely ground coral (calcium carbonate) , BFW softener blowdown, ferrous sulfate, or flowers of sulfur. The amendments will be made within thirty (30) days of such finding and shall be recorded in the facility operating record.

III.B.4. The Permittee shall till the ZOI at least twice per month when wastes are being placed on landfarm. This may be accomplished by two passes during the same tilling event.

III.B.5. The Permittee shall maintain a logbook(s) for the landfarm. All entries must be made in ink and must be initialed. The following information must be recorded:

a. The waste type and amount applied (both total amount applied and amount of oil applied);

b. Oil loading rate (tons/acre/application);

c. The plot loaded;

d. Dates(s) of application;

e. Climatic conditions surrounding date of application;

f. Application method; and

g. Dates and locations of tillage.

III.B.6. Specific Design Requirements

1. Run-on and Run-off Control Systems. The land treatment plot areas shall be designed and constructed, operated, maintained, and managed to prevent washout of any hazardous waste and to prevent inundation of and discharges from the areas surrounding the facility components.

   a. The Permittee shall maintain a run-on control system capable of preventing flow onto the treatment zone during peak discharge from at least a 25-year, 24-hour storm.

   b. The Permittee shall maintain a run-off management system that is able to hold at least the stormwater volume resulting from a 25-year, 24-hour storm.

   c. In order to maintain the design capacity of the run-on and run-off control systems, the Permittee shall ensure that all dikes are in good conditions and the grading of the land treatment unit is appropriate to prevent liquid overflow from the unit.

2. Decontamination of Equipment. The Permittee shall ensure that any equipment or vehicles which have come in contact with wastes in the disposal area have been decontaminated prior to their movement out of the designated contaminated areas of the site property. At a minimum, all contaminated equipment shall be externally washed and contaminated vehicles shall have their undercarriages and tires or tracks washed, with all washings sufficient to prevent contamination of uncontaminated areas. All wash water shall be redistributed on the Land Treatment Facility as irrigation water.

3. Treatment Zone Description. The land treatment zone for the treatment plot shall meet the following design specifications:

a. The plot shall have a treatment zone depth not greater than 5 feet from the original soil surface; and

b. The maximum depth of the treatment zone for the plot shall be at least 3 feet (1 meter) above the seasonal high water table.

III.B.7. The Permittee shall keep ditches and all drainage ways clear of sediment and debris. Standing water must be removed within 48 hours of observation.

III.B.8. Wastes shall only be applied by methods which ensure that wastes are evenly distributed across the ZOI.

III.C. FIELD TESTING AND UNSATURATED ZONE MONITORING PROGRAMS

III.C.1. The Permittee shall perform semi-annual sampling of the landfarm to determine:

a. if hazardous constituents have moved below the defined treatment zone;

b. if so, how far they have moved; and

c. if degradation, immobilization, and/or transformation is occurring within the treatment zone.

Soil core samples shall be collected at approximately six-month intervals.

III.C.2. For soil core sampling, the Permittee shall randomly select two sample locations within each plot in the landfarm.

III.C.3. Soil core sampling shall comply with the provisions of Permit Appendix A. Soil samples shall be collected at (1) the midtreatment zone interval, and (2) 12 to 18 inches below the soil/coral interface.

III.C.4 Soil core analyses shall conform to the provisions of Permit Appendix A. The Permittee shall analyze the samples prepared according to Permit Condition III.C.3. for pH, oil and grease, and principal hazardous constituents (Tier II). The Permittee shall tabulate the data to show the results of the analyses. These tables shall be placed in the facility operating record. (Note: maximum reportable method detection limits for Tier II constituents are provided in Table III.2).

III.C.5. The Permittee shall compare each of the species concentrations for principal hazardous constituents in all BTZ soil core samples with the upper tolerance limits (TL) as determined in Permit Conditions III.C.5.a. through III.C.5.e. Any metal concentration found in BTZ soil core samples which exceeds the TL shall be considered potentially significant, and must be verified by immediate resampling within five (5) feet of the previous sampling location. A repeat concentration of any principal hazardous constituent in the repeat sample exceeding the TL shall indicate significant contamination.

a. background PHC concentrations will be established by a one time collection of eight (8) coral samples from one foot below the soil/coral interface at randomly selected locations outside the active land treatment area which have not been impacted by land treatment activities. These samples will be composited in pairs (from immediately adjacent locations) to form four samples for analysis. Background concentrations are to be determined within 45 days of the permit modification's effective date.

b. the mean concentration of background PHC constituents in coral is to be determined by averaging the three sample results. If background sampling has indicated all below PQL values for given principal hazardous constituents, a normal distribution of values with a mean of the practical quantification limit and a standard deviation of 1/2 of the practical quantification limit is to be used for calculation purposes.

c. the upper 95 percent tolerance limit for metal concentrations in background coral is to be established using the following equation:

$$TL = Mean + KS$$

Where, S = standard deviation, and
K = one-sided tolerance factor of 5.145 for four background samples.

d. the TL for each PHC metal is to be determined during the first semi-annual soil monitoring activity.

e. once determined, the TL for each metal is to be incorporated as part of this Permit.

III.C.6. The Permittee shall conduct sampling of the three active area lysimeters and one background lysimeter four times per year. Each sampling event will be timed to occur within 48 hours of a significant waste application (>10 tons) or a significant rainfall (>0.5 inches) in 24 hours.

Lysimeter sampling shall be performed in accordance with Permit Appendix B. Lysimeter samples shall not be composited.

III.C.7. The Permittee shall analyze landfarm lysimeter samples to determine the concentrations of principal hazardous constituents. The Permittee shall determine whether the concentrations of principal hazardous constituents exceed the maximum contaminant levels (MCL) or practical quantification limit if an MCL has not been established for a specific constituent (see Table III.1). A concentration of any principal hazardous constituent above the appropriate MCL or PQL shall be considered potentially significant, and must be verified by immediately (allowing for purging and recovery) reanalyzing the lysimeter in question. A repeated presence of the constituent, above the MCL or PQL, in the second sample shall be deemed indicative of significant contamination.

III.C.9. If the Permittee determines that BTZ soil core or soil-pore liquid concentrations of principal hazardous constituents exceed, in any landfarm plot, the standards set forth in Permit Conditions III.C.5, III.C.6., or III.C.8., the Permittee shall initiate the actions required by Permit Conditions III.C.9.a. through III.C.9.c.

a. The Permittee shall notify the Director in writing, within fourteen (14) days. The notification shall indicate which constituents have shown statistically significant increases and in which plot(s). The notification shall include tabulated results as well as the laboratory reports.

b. The Permittee shall suspend the application of wastes on the landfarm plot which exhibits significant PHC concentrations in a BTZ soil sample or lysimeter sample. If the permittee wishes to treat wastes on the affected plot(s) of the landfarm in the future, he/she shall submit to the Director an application for a permit modification to modify the operating practices at the plot in order to maximize the success of degradation, transformation, or immobilization processes in the treatment zone. If the Permittee does not wish to continue treating wastes on the affected plot(s) of the landfarm, he/she shall notify the Director within 90 days of that decision. If plots are taken out of service, the Permittee shall continue to comply with all requirements of Part III of this Permit until landfarm closure begins.

c. The Permittee shall discontinue the use of the plot represented by the lysimeter or soil core pending the Director's review of the permit modification application (or closure).

d. The Permittee may demonstrate that the contamination is localized in nature and not indicative of landfarm failure; that a source other than the regulated unit caused the high concentration; or that the high concentration resulted from an error in sampling, analysis or evaluation. The Permittee may only demonstrate that the contamination resulted from an error in sampling, analysis or evaluation if the criteria of Permit Appendix A or B were not met

In making a demonstration under this Permit Condition the Permittee must notify the Director in writing within fourteen (14) days of determining a high concentration below the treatment zone that he/she intends to make such demonstration. The Permittee is not relieved from compliance with Permit Conditions III.C.9.a. through III.C.9.c. until so notified by the Director.

III.C.10. The Permittee maintain a sample lysimeter in each active area of the Landfarm (Plots A, B, and C) and shall replace any lysimeter which becomes unserviceable, for any reason, during the life of this Permit. Replacement shall be accomplished no later than 45 days after determination that a lysimeter is unserviceable. If a sampling event was missed, the newly installed lysimeter shall be sampled as soon as physically possible. The date that the lysimeter went out of service, date it was replaced, and installation details shall be kept in the operating record.

RECORDS SEPARATOR PAGE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, Ca. 94105-3901

JAN 10 1994

Certified Mail No: P 389 855 254
Return Receipt Requested

Mr. Karl Mohn, Manager
Chevron Hawaiian Refinery
P.O. Box 29789
Honolulu, HI 96820

Dear Mr. Mohn:

This letter is written in response to the unsaturated zone monitoring plan which Chevron submitted to EPA on November 12, 1991.

Pursuant to 40 CFR §270.42, EPA hereby acknowledges receipt of this plan as a Class I permit modification requiring prior approval of the Director. The operational changes requested in this permit modification together with the unsaturated zone monitoring plan will be considered a repeat of the Land Treatment Demonstration. Furthermore, comments received from EPA on the Plan dated May 21, 1992 are considered informal preliminary comments. EPA offers the following comments as notice of technical deficiencies in the permit modification request. A response to the following comments is due to EPA within ninety (90) calendar days from receipt of this correspondence.

1) Below Treatment Zone (BTZ) will be defined as the soil-core sampling level below the defined treatment zone. For this site, defined as 12 to 18" below the bottom of the soil/core interface. Soil-core lysimeters will also be installed and sampled from this depth. Section III.C.3 must be modified to require core samples from this zone rather than to the currently indicated 24" below the soil/coral interface.

2) Mercury must be added to the list of Principal Hazardous Constituents (PHCs).

3) For the purpose of the statistical procedure proposed for unsaturated zone monitoring, EPA has determined that a minimum of eight background samples must be used. Chevron must either:

(a) Propose a procedure by which a minimum of eight background samples are obtained, either by additional background sample locations or by

taking replicate samples from the same background locations.

(b) Propose another statistical method based on the fact that only three background samples will be obtained.

4) The operational changes requested in the permit modification (Section III.B.11) must be amended to indicate a maximum loading of 10% oil and grease.

5) Section III.C.5 must be modified to include all principal hazardous constituents, not just the metal constituents. Section III.C.6 as drafted should therefore be eliminated. Verification sampling must occur within ten days of receiving analysis results from the initial sampling event. Furthermore, explain why a distance of ten feet from the original sampling location is specified for resampling verification. Section III.C.5 must be modified to include reference to the section which contains response procedures should a significant concentration be detected. Lastly, background PHC concentrations must be determined within 30 calendar days for the effective date of the permit modification (Section III.C.5.a).

6) Chevron must include provisions in the permit modification request to construct and sample lysimeters within the active areas of Plots B and C, in addition to those in Plot A.

7) Permit conditions which address Chevron's response to a determination of a significant PHC concentration in a BTZ soil core or lysimeter sample (Section III.C. as drafted), must include provisions that no more waste will be applied to the individual landfarm plot exhibiting significant BTZ or lysimeter sample concentrations. These provisions must specify that a permit modification will either be submitted to allow for partial closure of the individual plot, or to allow for modified operational conditions and renewed use of that plot. The permit modification must allow for operation of the landfarm plot so that adequate degradation, transformation, or immobilization of waste constituents occurs.

Please have the response to the above comments either in the form of an entirely new submittal, or as revisions which can be inserted into the original submittal. Because this permit modification will be handled as a Class I modification to repeat the Land Treatment Demonstration, Chevron will be required to submit a report on unsaturated zone monitoring results after the first half-year of operation under the modified permit

conditions. Permit conditions requiring such will be included into the permit once a final decision is made on the permit modification request.

Promulgation of the Land Disposal Restrictions (LDR) has increasingly limited which hazardous wastes may be applied to the landfarm. Currently the only hazardous wastes which may be applied to the landfarm without first being treated to LDR standards are those wastes that are hazardous only because of the TC characteristic. LDR treatment standards for TC hazardous wastes were proposed in September 1993. EPA's current agenda is to promulgate final LDR treatment standards for these wastes in July 1994. After final promulgation the standards will likely become effective within one year.

It seems unlikely that Chevron will find it practical to continue to use the landfarm for hazardous waste treatment once the LDR treatment standards are in effect. Chevron may however decide to continue to use the landfarm for treatment of non-hazardous wastes only. If so, a permit modification must be submitted to address the requirements found in 40 CFR §264.113(d). Pursuant to 40 CFR §264.113(d)(4), a permit modification to allow for continued application of non-hazardous waste must be received by EPA at least 120 days prior to the date the landfarm receives the last application of hazardous waste. If the permit is modified so that the landfarm continues to receive only non-hazardous waste, all conditions of the permit are effective just as if the landfarm were a hazardous waste treatment unit. Regardless if Chevron should decide that the landfarm will be closed, or operated to only receive non-hazardous wastes, it is EPA's determination that the unsaturated zone monitoring plan and associated permit modification must be implemented.

It may be advantageous for Chevron to combine the response to this Notice of Deficiency with a Class II permit modification request to allow for treatment of only non-hazardous wastes.

EPA would like to encourage open communication concerning regulatory issues Chevron Hawaiian Refinery's land treatment unit. Please contact Tim Stott at (415)744-2026 should you have any questions.

Sincerely,

Rich Vaille, Chief
State Programs Branch

cc: Grace Simmons, Hawaii Department of Health
Cindy Kmetz, Chevron Hawaiian Refinery

bc: Tim